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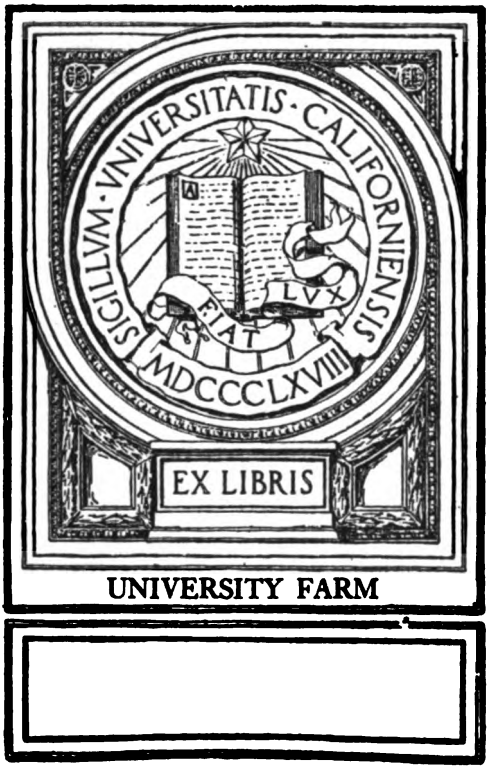

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REPORT

OF THE

IOWA STATE HORTICULTURAL SOCIETY,

FOR THE YEAR 1893.

CONTAINING THE PROCEEDINGS OF THE

TWENTY-EIGHTH ANNUAL SESSION,

HELD AT

Des Moines, November 21, 22, 23, 24, 1893.

ALSO TRANSACTIONS OF THE

Northwestern, Northeastern, Southwestern and Southeastern Horticultural Societies,

AND THE

Proceedings of the Academy of Sciences, for the year 1893.

EDITED BY THE SECRETARY.

VOL. XXVIII.

PUBLISHED BY THE STATE.

DES MOINES:
G. H. RAGSDALE, STATE PRINTER.
1894.

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LETTER OF TRANSMITTAL.

To His Excellency, FRANK D. JACKSON, *Governor of the State of Iowa:*

In compliance with legal requisition, I have the honor of submitting to you herewith the twenty-eighth annual report of the Iowa State Horticultural Society, including the reports of the four district societies into which the State is now divided.

Though an "off" year with the orchard fruits such as has not been known in recent years, I am glad to report that we were able to show about two hundred varieties of fine apples at the Columbian Exposition more than any State of the Union or country of the world. Our exhibits of other orchard fruits and of the grape and small fruits were also extremely creditable. Our fruit exhibits and our annual volume of reports attracted the attention of all visitors.

Permit me to say that the society has a fine record in this and other countries for the good work it has done in the past, and to express the hope that it will have the continued support and kindly consideration of the executive and our legislature.

In compliance with the act of 1892, I also include the proceedings of the Iowa Academy of Sciences for 1893 as an appendix.

Very respectfully,

J. L. BUDD,
Secretary.

Ames, Iowa, January 15, 1894.

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OFFICERS.

OF THE

IOWA STATE HORTICULTURAL SOCIETY,

FOR THE YEAR 1894.

PRESIDENT,

A. F. COLLMAN, - - - - - - - *Corning*

VICE-PRESIDENT,

J. C. FERRIS, - - - - - - - - *Hampton*

SECRETARY,

J. L. BUDD, - - - - - - - - - *Ames*

TREASURER,

SILAS WILSON, - - - - - - - - *Atlantic*

LIBRARIAN AND CUSTODIAN,

ED WRIGHT, - - - - - - - - *Des Moines*

DIRECTORS.

First	*District*—SAMUEL PARK, - - - -	*Ottumwa*
Second	*District*—BEN McCOY, - - - - -	*Oskaloosa*
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Tenth	*District*—M. E. HINKLEY, - - - - -	*Marcus*
Eleventh	*District*—ELMER REEVES, - - - -	*Waverly*
Twelfth	*District*—J. M. ELDER, - - - - -	*Concord*

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FRUIT DISTRICTS

REPRESENTED BY THE DIRECTORS NAMED ON PRECEDING PAGE.

First District—Lee, Des Moines, Louisa, Henry, Washington, Jefferson, Van Buren, Keokuk, Wapello and Davis.

Second District—Mahaska, Monroe, Appanoose, Marion, Lucas, Wayne, Clarke, Decatur, Ringgold and Union.

Third District—Adams, Taylor, Montgomery, Page, Mills, Fremont, Pottawattamie, Cass, Audubon, Shelby and Harrison.

Fourth District—Muscatine, Scott, Clinton, Jackson, Jones, Cedar and Linn.

Fifth District—Benton, Johnson, Iowa, Tama, Poweshiek, Marshall and Jasper.

Sixth District—Story, Polk, Warren, Boone, Dallas, Madison, Adair, Greene and Guthrie.

Seventh District—Carroll, Crawford, Monona, Woodbury, Ida and Sac.

Eighth District—Dubuque, Clayton, Delaware, Fayette, Buchanan, Black Hawk and Grundy.

Ninth District—Butler, Franklin, Hardin, Wright, Hamilton, Humboldt, Webster, Calhoun and Pocahontas.

Tenth District—Buena Vista, Cherokee, Plymouth, Sioux and O'Brien.

Eleventh District—Allamakee, Winneshiek, Howard, Chickasaw, Mitchell, Floyd, Worth, Cerro Gordo and Bremer.

Twelfth District—Winnebago, Hancock, Kossuth, Emmet, Palo Alto, Dickinson, Clay, Osceola and Lyon.

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STANDING COMMITTEES FOR 1894.

COMMERCIAL ORCHARDING.

Northern District—M. E. Hinkley... .....Marcus
Central District—H. W. Lathrop.....Iowa City
Southen District—Ben. McCoy.....Oskaloosa
Southwest District—F. M. Powell.....Glenwood

THE FARMERS' ORCHARD AND GARDEN IN NORTHERN IOWA.

J. M. Elder.....Concord
B. F. Ferris.....Hampton

THE FIRST FIVE YEARS OF ORCHARD MANAGEMENT.

M. J. Graham.....Adel

THE OLDENBURG AND OTHER IRON-CLAD LATE SUMMER AND FALL APPLES AS WINTER FRUITS.

W. C. Haviland .....Fort Dodge

CO-OPERATIVE ORCHARD FRUIT HANDLING AND SELLING.

John Y. Stone.....Glenwood

FRUIT STORAGE.

D. A. Kent.....Ames

THE HOME CANNING OF FRUITS.

Miss Flora Wilson.....Ames

UTILIZING WASTE ORCHARD PRODUCTS.

D. L. Heinsheimer. .....Glenwood

THE CHEMISTRY OF OUR BEST JELLY-PRODUCING FRUITS.

G. E. Patrick .....Ames

IS THE TREE VENDER A NECESSARY EVIL?

W. A. Burnap.....Mason City

THE FUTURE OF OUR STONE FRUITS.

M. J. Wragg .....Waukee

BEST SOILS, ELEVATIONS AND VARIETIES OF THE PEAR.

B. A. Mathews.....Knoxville

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THE FUTURE OF GRAPE GROWING IN IOWA.

Silas Wilson.....Atlantic

MARKETING GRAPES AND SMALL FRUITS.

W. M. Bomberger.....Harlan
L. O. Williams.....Council Bluffs

OUR NUT-BEARING TREES AND SHRUBS AND THEIR POSSIBLE DEVELOPMENT.

J. L. Budd.....Ames

SPRAYING FOR INSECTS AND FUNGI.

Herbert Osborn.....Ames
L. H. Pammel.....Ames

NURSERY MANAGEMENT AND PROPAGATION.

C. G. Patten.....Charles City
J. C. Ferris.....Hampton

THE BENEFITS OF CUTTING BACK FRUIT TREES AND SHRUBS IN NURSERY.

George D. Thomas.....Des Moines

THE BEST FRUIT SOILS OF IOWA.

Chas. R. Keyes.....Des Moines

OUTCOME OF OUR TRIAL STATIONS.

G. B. Brackett.....Denmark

SHELTER BELTS FROM THE STANDPOINT OF LESSENED EVAPORATION.

J. R. Sage.....Des Moines

TIMBER PLANTING FROM THE STANDPOINTS OF ORCHARD SHELTERS AND CLIMATIC MODIFICATION.

Elmer Reeves.....Waverly
W. H. Guilford.....Dubuque

SENSIBLE LEGISLATION ON THE FORESTRY QUESTION.

J. G. Berryhill.....Des Moines

GATHERING, KEEPING AND PLANTING OF CONIFER AND FOREST TREE SEEDS.

C. F. Gardner.....Osage

THE TIMBER-GROWING PINES BEST ADAPTED TO OUR SANDY BOTTOMS AND RIDGES.

Ed. Hoyt.....Scotch Grove
John Wragg.....Waukee

LAYING OUT AND PLANTING OF SCHOOL GROUNDS.

President W. M. Beardshear.....Ames

THE NEW EDUCATION.

James Wilson.....Ames

OUR FLORAL PETS AND THEIR POSSIBLE CHANGES IN COLOR.

Miss Etta M. Budd.....Ames

ELEMENTS OF HORTICULTURE IN OUR COMMON SCHOOLS.

Mrs. L. H. Pammel.....Ames

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THE IDEAL RURAL AND SUBURBAN HOME.

Mrs. Herbert Osborn.....Ames

FRUITS AND FLOWERS IN THE KITCHEN AND ON THE TABLE.

Mrs. Eliza Owens.....Ames

OUT-DOOR FLORICULTURE FOR WOMEN FROM THE HEALTH AND ÆSTHETIC STANDPOINTS.

Miss Mary A. Nichols.....State Center

ORNAMENTAL SHRUBS AND TREES.

For the north half of the State, H. W. Ash.....West Union
For the south half of the State, W. H. Lewis.....Winterset

THE TREES AND SHRUBS OF THE LAWN—THEIR SELECTION, ARRANGEMENT AND MANAGEMENT.

C. L. Watrous.....Des Moines

OUR NATIVE SHRUBS AND VINES AND THEIR POSSIBLE IMPROVEMENT.

J. J. Edgerton.....Ames

FLORAL DESIGNS.

Miss Gertrude Blair.....Des Moines

THE ROSE, ITS MANAGEMENT AND IMPROVEMENT.

James Carss.....Des Moines

BEDDING PLANTS AND ANNUAL FLOWERS.

W. Greene.....Davenport

THE BEST BULBS FOR THE AMATEUR.

Geo. W. Carver.....Ames

THE MISSION OF THE BIRDS AND BEES IN THE ORCHARD AND GARDEN.

Eugene Secor.....Forest City

HORTICULTURAL PHOTOGRAPHY.

F. Atwood Sirrine.....Ames

WHY IS OUR CLIMATE MORE TRYING ON FRUITS AND THE CEREALS THAN THIRTY YEARS AGO?

R. P. Speer.....Cedar Falls

CLIMATIC MODIFICATION OF FRUITS.

A. F. Collman.....Corning

THE COLOR OF BLOSSOMS AND FRUIT FROM A CLIMATIC STANDPOINT.

N. E. Hansen.....Ames

BEHAVIOR OF TREES AND SMALL FRUITS ON THE HIGHLAND AND IN THE VALLEY.

H. A. Terry.....Crescent

MANURE IN ITS RELATIONS TO TREE AND PLANT EVAPORATION.

C. D. Reed.....Ames

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EXPERIMENT STATIONS.

GENERAL MANAGER, G. B. BRACKETT, DENMARK.

LIST OF COMMITTEE IN CHARGE OF STATIONS.

MEMBERS ELECTED IN 1883.

J. L. Budd..... Ames
G. B. Brackett..... Denmark
C. G. Patten..... Charles City
C. L. Watrous..... Des Moines

MEMBERS ELECTED IN 1884.

Silas Wilson..... Atlantic
W. C. Haviland..... Fort Dodge
H. A. Terry..... Crescent
O. A. Kenyon..... McGregor
A. F. Collman..... Corning
R. P. Speer..... Cedar Falls
Eugene Secor..... Forest City
M. E. Hinkley..... Marcus

MEMBERS ELECTED IN 1885.

J. C. Ferris..... Hampton
John Wragg..... Waukee

MEMBERS ELECTED IN 1887.

W. H. Guilford..... Center Grove
Chas. F. Gardner..... Osage

COMMITTEE FOR PURCHASING AND DISTRIBUTING PLANTS, ETC.

J. L. Budd..... Ames
C. L. Watrous..... Des Moines
Silas Wilson..... Atlantic
G. B. Brackett..... Denmark
C. G. Patten..... Charles City

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LIST OF MEMBERS.

HONORARY LIFE MEMBERS.

Bessey, Prof. C. E. ..... Lincoln, Nebraska
Brackett, G. B. ..... Denmark
Cheney-Hand, Mrs. Mary ..... Charles City
Clarkson, C. F. (deceased) ..... Des Moines
Gideon, Peter M. ..... Excelsior, Minnesota
Gear, J. H ..... Burlington
Grinnell, J. B. (deceased) ..... Grinnell
Hinrichs, G. ..... St. Louis, Missouri
Lathrop, H. W. ..... Iowa City
Scott, John ..... Nevada
Shankland, E. B. ..... Jennings, Louisiana
Smith, James (deceased) ..... Brookings, South Dakota
Swalm, Al W. ..... Oskaloosa
Thompson, Mrs. P. ..... Grundy Center

HONORARY MEMBERS.

Budd, Miss Etta M. ..... Ames
Harris, J. S. ..... La Crescent, Minnesota
Kennedy, Dr. J. F. ..... Des Moines
Nichols, Miss Mary A. ..... State Center
Osborn, Mrs. Herbert ..... Ames
Pammel, Mrs. L. H. ..... Ames
Thayer, M. A. ..... Sparta, Wisconsin

LIFE MEMBERS.

Arey, Prof. M. F. ..... Cedar Falls
Atkin, D ..... Amber
Bannister, D. ..... Ottumwa
Bacon, George S. ..... Des Moines
Bailey, M. ..... Winterset
Baker, H. ..... Pleasant Prairie
Barker, John ..... Scribner, Nebraska
Bartholomew, J. L. ..... Moorhead
Berryhill, James G. ..... Des Moines
Boutelle, T. N. ..... Ft. Dodge
Budd, Prof. J. L. ..... Ames
Calkins, E. H ..... Burlington

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Carpenter, O. W.....Dedham
Collman, A. F.....Corning
Corlett, John E.....Farmersburg
Councilman, S. J.....Jefferson
Crawford, Wm.....Plattsmouth, Nebraska
Curtis, B. O.....Paris, Illinois
Dayton, John F.....Waukon
Dewey, F. G.....Esmond, Dakota
Dillon, W. H.....De Soto
Double, Z.....Seymour
Eggert, Ernest.....Pendleton, Oregon
Elder, J. M.....Concord
Frame, J. T.....West Branch
French, E. Y.....Epworth
Fluke, N. K.....Davenport
Gardner, Chas. F.....Osage
Garrison, A. E.....Des Moines
Goss, S. G.....Border Plains
Greene, W.....Davenport
Gue, B. F.....Des Moines
Haag, J. S.....Hosper
Hallett, E. W.....Galena, Illinois
Harris, A. W.....Sibley
Haviland, W. C.....Fort Dodge
Heisz, E. R.....Nora Springs
Hicks, John S.....Roslyn, Long Island
Hoffman, John A.....Roselle
Houten, Geo. Van.....Lenox
Hoyt, Ed.....Scotch Grove
Lawrence, A. H.....Le Mars
Larrabee, Hon. Wm.....Clermont
Lewis, W. H.....Winterset
Lister, John.....Conrad Grove
Livingston, G. W.....Monroe
Lonsdale, Jas.....Dale City
Mead, E. (deceased).....Davenport
Monroe, W. C.....Anamosa
Moon, R. G.....Bedford
Parsons, M. D. L.....Algona
Parrott, Matt.....Waterloo
Patten, C. G.....Charles City
Peddie, Alex.....Emmetsburg
Porterfield, D. A.....Traer
Prouty, J. M.....Humboldt
Putz, John.....Elkport
Pugsley, M.....Woodbine
Rarey, Henry W.....Griswold
Raymond, H. C.....Council Bluffs
Reeves, N. A.....Waverly
Reeves, Elmer M.....Waverly

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Rowen, James D.....Des Moines
Royer, C. B .....Dallas Center
Secor, E.....Forest City
Sherman, E M.....Charles City
Smith, J. W.....Charles City
Steigerwalt, W. F.....Carroll
Strohm, H.....Iowa City
Sturtz, G. W.....Plainview, Nebraska
Tatum, L.....Springdale
Thatcher, Jonathan.....Bonaparte
Thompson, J. S. B.....Grundy Center
Town, S.....Canby
Watrous, C. L.....Des Moines
Wegman, Theo. (deceased).....Roselle
Wright, Gen. Ed.....Des Moines
Willard, W. O.....Grinnell
Williams, H. P.....Larchwood
Williams, A. G.....Chester Center
Wilson, S.....Atlantic
Worth, W. T.....Climbing Hill
Wragg, J.....Waukee

ANNUAL MEMBERS FOR 1894.

Battersby, J. R.....Lewis
Bean, C. F.....Marathon
Beebe, Charles L.....Modale
Berger, A. J.....Indianola
Blackman, F. W.....Nevada
Bomberger, W. M.....Harlan
Boyer, J. L.....Indianola
Blaine, S. W.....Polk City
Bradway, Theo.....Des Moines
Braucht, Charles.....Indianola
Brewer, Richard.....Stiles
Brown, E. E.....Onslow
Cady, C. M.....Stuart
Cairns, J. L.....Belknap
Carns, O. L.....Belknap
Case, N. T.....Box 108, East Des Moines
Chase, E. O.....Des Moines
Christman, Peter.....Dubuque
Cooper George.....Clive, Polk county
Culver, O. M.....Tipton
Dans, W. B.....Audubon
Elder, J. W.....Concord
Faville, E. E.....Wolfville, N. S., Canada
Fearis, Walt.....Richland
Ferris, B. F.....Hampton
Ferris, J. C.....Hampton
Fonts, W. A.....Missouri Valley

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Garrett, C. O.....Ivy
Giddings, H.H.....Sabula
Graham, M. J.....Adel
Guilford, W. H.....Dubuque
Guthrie, K. H.....Des Moines
Hansen, N. E.....Ames
Harrington, Frank O.....York Center
Harter, H. M.....Waterloo
Heinsheimer, D. L.....Glenwood
Higgins, S. B.....Rushville, Nebraska
Hill, J. W.....Des Moines
Hinkley, M. E.....Marcus
Hudson, D. W.....Redding, Ringgold county
Hunt, Henry.....De Soto
Iowa Seed Co.....Des Moines
Irish, H. C.....Ames
Judd, James Strong.....Chicago, Illinois
Karns, Jerry.....Des Moines
Kelly, P. P.....Glenwood
Kempker, J. F.....Adair
Kenyon, O. A.....McGregor
Leuellin, F.....Newton
Lyon, C. H.....Des Moines
McCoy, Ben.....Oskaloosa
McCoy, H. D.....Knoxville
McDonnell, N. S.....Des Moines
McGeehon, R. D.....Atlantic
McLuen, Wm.....Perry
Miller, R. K.....634 E. Grand Ave., Des Moines
Myers, W. W.....Lamoille
Murphy, J. W.....Glenwood
Nielsen, Lewis.....Forest City
Nielly, Walter J.....Grinnell
Osborn, Herbert.....Ames
Pammel, L. H.....Ames
Park, S.....Ottumwa
Patterson, D. B.....Des Moines
Philips, N. G.....Ivy
Pidgeon, D. A.....New Providence
Plummer, A. L.....Ivy
Powell, F. M.....Glenwood
Radeleff, H. D.....Manning
Reed, C. E.....New Virginia
Reed, C. D.....Coon Rapids
Reel, J. A.....Missouri Valley
Sayers, J. H.....Des Moines
Shaul, W. H.....Des Moines
Shontz, B.....Correctionville
Snyder, A.....Center Point
Speer, R. P.....Cedar Falls

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Steinman, C. ..... Mapleton
Stewart, C. W. ..... Cleve
Stone, J. Y. ..... Glenwood
Storm, J. V. ..... Nevada
Stuart, B. ..... Ivy, Polk county
Talley, Samuel H. ..... Bellville
Thomas, G. D. ..... Des Moines
Trimble, S. C. ..... Des Moines
Watson, E. B. ..... Newton
Williams, Theo. ..... Benson, Nebraska
Wragg, M. J. ..... Waukee

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LIST OF PREMIUMS.

Offered for the Production of Seedling Fruits.

DISTRICTS.

The State will be divided into two districts, with a view to adaptation of varieties to our varied soil and climate.

1. The North District shall include the counties north of the north line of Linn county, or the county lines nearest thereto across the State.

2. The South District shall include the counties south of the above line.

STANDARD OF HARDINESS, SIZE, QUALITY, ETC.

1. The variety of the apple worthy of first premium in the North District must be as hardy and productive in tree as the Oldenburg, and the fruit as good in quality as Wealthy. In average size it must not be less than two and three-fourths inches in diameter, and it must keep, with ordinary care, until April or later.

2. In the South District the Oldenburg shall be the standard as to hardiness and productiveness of tree, and size of fruit, while the quality must equal Grimes Golden and its keeping capacity the Willow.

REGULATIONS.

1. Any fruit to obtain first premium must excel any known sort in enough of the essentials of hardiness, productiveness, healthfulness and vigor of tree, vine or plant, also of size and general appearance of fruit, quality for dessert, cooking, canning, shipping and keeping, to stamp it clearly in advance of any other variety grown in the district at time of awarding premium.

2. No premium will be awarded on any orchard fruit, or small fruit, from seedlings which bore fruit prior to 1885.

3. Before a second premium shall be paid, scions, cuttings, or plants shall be furnished the Society for use of the Experiment Committee, the quantity to be fixed by the Society.

4. A member of Visiting Committee of the Society living in the District may be ordered to visit and report on the leaf, habit, apparent vigor, etc., of any variety competing for the second award in the cumulative list of premiums.

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5. We would recommend the election by ballot of a committee of three to award premiums on orchard fruits, and a like committee on small fruits, and we recommend the election of said committee by the directors and officers of the Society.

6. All seedlings must be grown from seed in Iowa, and must be fruited in the District from which they are entered for premium.

PREMIUM LISTS.

APPLES.

The following list of premiums will be duplicated in the two districts named above:

First period of five years.

The most promising seedling	$ 10.00
Second premium	7.50
Third premium	5.00
On the fifth year, the variety which has taken first premium three times out of five will receive a premium of	100.00
Second premium (three out of five)	75.00
Third premium (three out of five)	50.00

Second period of five years.

The prize varieties of the first period may receive—if still found worthy—an annual premium of	20.00
Second premium	15.00
Third premium	10.00
At the end of the second period—ten years—the variety receiving three out of five of the first premiums will receive	200.00
Three out of five of second awards	150.00
Three out of five of third awards	100.00

Third period of five years.

Annual premium	40.00
Second premium	30.00
Third premium	20.00
And sweepstakes as before for three out of five first premiums	300.00
Three out of five second premiums	225.00
Three out of five third premiums	150.00

Fourth period of five years.

Annual premium	80.00
Second premium	60.00
Third premium	40.00
Grand final sweepstakes as before on first awards	500.00
On second awards	375.00
On third awards	250.00

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PREMIUMS ON PEAR SEEDLINGS.

The seedlings of the pear competing successfully for first premiums must be as hardy in tree as the required apple of the respective districts, and the quality of fruit must approach that of the Flemish Beauty.

Annual premium	$ 20.00
Second premium	15.00
Third premium	10.00
At the end of five years the variety taking the first premium three years out of five will receive a premium of	50.00
Second premium	37.50
Third premium	25.00

During the second, third and fourth periods of five years each the annual premium will remain same as first year, and at the end of each period the successful variety will receive successively $75.00, $100.00 and $200.00; the second and third premiums proportioned as above.

PREMIUMS ON CHERRY SEEDLINGS.

The successful variety of the cherry must prove as hardy as the apple for the respective districts; and the quality and size of fruit must excel the Early Richmond.

The award of premiums will be the same in amount annually as in the pear list, and the premiums at the end of each five years the same, but the final premium will be awarded at the close of the third period.

PREMIUMS ON PLUMS.

The successful seedling plum shall equal the DeSoto in hardiness and productiveness, and superior to it in size and quality.

Premiums will duplicate those of cherry list in amount and periods of trial.

PREMIUMS ON GRAPES.

The successful grape must ripen one week earlier than Worden and be equal in productiveness and size, but must excel in quality and hardiness of vine.

The premiums on the grape, and the small fruits generally, will be open to the whole State, and will not be duplicated in the Districts, as with the orchard fruits.

Best seedling grape	$ 20.00
Second best	15.00
Third best	10.00
At the end of five years the variety taking three out of five premiums will receive	100.00
Second best	75.00
Third best	50.00
During the second period the annual premiums remain the same, and at end of ten years the successful variety will receive	200.00
Second best	150.00
Third best	100.00

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PREMIUMS ON OTHER SMALL FRUITS.

The successful seedling of the currant, gooseberry, raspberry, blackberry and strawberry shall receive a premium of..... .....$ 10.00
Second premium..... 7.50
Third premium..... 5.00
At end of seven years the variety of either fruit taking five first premiums out of a possible seven will be awarded..... 50 00
Second award..... 37.50
Third award..... 25.00

We recommend that the currant receiving first premium must equal the Long Bunched Holland in perfection of growth and leaf; must equal the White Grape in quality of fruit, and must reach the size of the Fay.

The gooseberry must equal the Houghton in hardiness and productiveness, and the fruit in size and quality must compare favorably with the best English sorts.

The raspberry must be as hardy as Shaffer's Colossal, and superior to it in quality and color of fruit. If a black variety it must be hardier than Tyler, and excel it in productiveness, size and quality of fruit.

The strawberry must be as hardy and productive as Crescent, as large and good in fruit as the Charles Downing, and as good in color and capacity for shipping as Wilson.

The blackberry must be hardier than Snyder and superior to it in size, productiveness and quality.

PREMIUMS OF FRUITS AND FLOWERS.

To be awarded at the annual meeting of the State Horticultural Society at Des Moines, second Tuesday in December, 1894.

Where the word "fruit" occurs in this list, grafted fruit is meant, except where otherwise specified.

*Best collection of fruit grown in any county in southern Iowa.....$ 20.00
Second best collection of fruit grown in any county in southern Iowa 10.00

Southern Iowa shall mean the three south tiers of counties.

Best collection of fruit grown in any county in central Iowa..... 20.00
Second best collection of fruit grown in any county in central Iowa... 10.00

Central Iowa embraces only the three central tiers of counties.

Northern Iowa shall embrace all north of the central district.

Best collection of fruits grown in any county in northern district.... 20.00
Second best collection of fruit grown in any county in northern district..... 10.00
Best collection of fruit grown by exhibitor. 10.00
Second best collection of fruit grown by exhibitor..... 5.00
Best collection of seedling apples grown by exhibitor..... 10.00
Second best collection of seedling apples grown by exhibitor..... 5.00
Best plate of any one of the varieties of the apple..... 1.00
Second best plate of any one of the varieties of the apple..... .50

*NOTE—It is not the object of the Society to encourage the exhibition of a great number of varieties irrespective of value of trees, productiveness, hardiness, etc. Hence the committee will interpret the words "best collection" to mean best specimens of our most satisfactory varieties for the several districts.

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PREMIUMS ON FLOWERS AND PLANTS.

Best collection of green-house plants	15.00
Second best collection of green-house plants	10.00
Best collection of house plants	10.00
Second best collection of house plants	5.00
Best display of cut flowers	8.00
Best collection of plants, *in bloom*, including roses	8.00
Second best collection of plants, *in bloom*, including roses	5.00
Best single foliage plants	3.00
Best rose in bloom	3.00
Best hanging basket or vase of vines or plants	3.00

This list of premiums on flowers and plants, it is hoped, will bring out large collections. If the collections be meagre the committee may award second premiums, if in their judgment a first premium is not merited.

Exhibitors must make entries with Secretary for *specific premiums.*

A "plate" of fruit means four or more specimens.

All fruit awarded premiums becomes the property of the Society and a removal of the fruit by the exhibitor will forfeit premiums.

Fruit must be labeled with correct name and seedlings must be properly labeled.

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LIST OF PREMIUMS

Offered for the Encouragement of Forest Tree Planting.

The following premiums are offered to encourage the planting of trees in permanent timber plantations or belts; the number of trees living to be ascertained by actual count between the 15th of September and the 10th of October, 1894. The award of the premiums to depend upon a full compliance with the rules appended to the schedule of premiums:

For the greatest number planted in groves, intrinsic value of species considered	$40.00
Second greatest number	25.00
Third greatest number	10.00
For the greatest number of Evergreens and Larch in plantations or belts	20.00
Second greatest number	15.00
Third greatest number	10.00
For the greatest number of Ash trees	20.00
Second greatest number	15.00
Third greatest number	10.00
The greatest number of nut-bearing trees, including Oaks	20.00
Second greatest number	15.00
Third greatest number	10.00
For the greatest number of Black Wild Cherry, Elm, Box-Elder, Birch or Catalpa *speciosa*	20.00
Second greatest number	15.00
Third greatest number	10.00
For the greatest number of Cottonwood, Basswood, Willow, Maple, and other soft wooded trees	20.00
Second greatest number	15.00
Third greatest number	10.00
For the greatest number of Honey Locust (from seed grown on thornless trees is preferable)	20.00
Second greatest number	15.00
Third greatest number	10.00

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REGULATIONS.

First. Persons competing for premiums must designate the class for which they compete; as for the greatest number of soft wooded trees, greatest number Evergreens, Larch, etc. A plantation may consist of a single variety enumerated or any number of the kinds mentioned.

Second. Additional plantations must be made for each separate entry for premiums. In other words, a person awarded a premium in one class will not be entitled to premiums on same trees in another class.

Third. The plantations competing for these premiums must be made with rooted seedlings or plants, with the exceptions herein mentioned: of Willows and soft wooded trees, growing readily from cuttings, strong cuttings may be used. In the class of nut-bearing trees, White Walnut, Black Walnut and Oak may be started from seed where wanted to remain. Plantations of Ash, Maple, Black Cherry, or any other forest trees, may be started from seeds, where they are to stand permanently, but they cannot be entered for premium until the close of the second year's growth.

Fourth. All trees, seeds and cuttings must be planted in permanent timber plantations or belts, in the spring of 1894, except where parties failed to get a sufficient stand in 1893, they may replant in 1894. The plantation must not be made at a greater distance than four feet each way; when counted there must be at least two thousand trees to each acre. The plantations competing for a premium must be on one farm, but need not be contiguous.

Fifth. The competitor must have his trees counted by two disinterested witnesses between the 15th of September and the 10th of October, counting only those that are alive at that time. After counting, competitors must make affidavit before a justice of the peace or notary public, as to the following facts:

A. Whole number of trees in permanent grove, planted in spring of 1894, and now alive; or if it is a replanted grove, planted in 1893, state the fact.

B. Name and number of each kind planted.

C. How planted.

D. How cultivated.

E. Cost of plantation.

F. Average size of each species of trees.

The parties who counted the trees must append their affidavits as to the correctness of the count. The officer who administers the affidavits shall certify to the identity and credibility of the competitor, and the parties who counted the trees.

Sixth. The above described affidavits to be forwarded to the Secretary of the State Horticultural Society, not later than November 1, 1894.

Seventh. Premiums will be awarded at the next regular meeting of the Society at Des Moines on the second Tuesday in December, 1894.

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CONSTITUTION,

AS ADOPTED JANUARY 10, 1868.

ARTICLE 1. This Society shall be called the Iowa State Horticultural Society, and shall have perpetual succession.

ART. 2. The object of this Society shall be the promotion and encouragement of horticulture and arboriculture, by the collection and dissemination of correct information concerning the cultivation of such fruits, flowers and trees, both deciduous and evergreen, as are adapted to the soil and climate of Iowa.

ART. 3. Said Society shall hold its annual meeting each year for the transaction of its business at such time as may be fixed by said Society, at which meeting officers shall be elected as follows: A President, Vice-President, Secretary, Treasurer and Librarian, who shall serve one year. The Society shall also elect one-half of a Board of Directors, the full Board not to exceed twelve in number, who shall serve two years, except vacancies on the board may be filled for the unexpired term.

ART. 4. The Secretary shall keep an accurate and full record of the proceedings of the Society. He shall open and carry on a correspondence with such fruit-growers, florists and horticulturists in general throughout the State as manifest an interest in the purposes of the Society. He shall annually make up a report for publication, embracing such information upon fruit-growing as may come within his reach, with a full report of the business affairs of the Society, and shall be allowed a reasonable compensation for his services.

ART. 5. The Treasurer shall have charge of the funds and other property of the Society, and dispose of them as decided by the board of officers. He shall pay out no money except upon the order of the President and countersigned by the Secretary. He shall make up a true and full report of all money and other property put into his hands for the benefit of the Society, with disbursements and vouchers, annually, and present the same to the Secretary on or before the first day of the meeting in December, and shall be required to give bond in such sum, and with such securities, as the Board shall direct, which bond shall be approved by the President and filed with the Secretary.

ART. 6. All accounts brought against the Society shall be audited by the Board.

ART. 7. The members present of the Board shall constitute a quorum for the transaction of business at any regularly called or adjourned meeting.

ART. 8. Any person may become a member of this Society by the annual payment of one dollar, or may become a life member by payment of five dollars.

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ART. 9. The fiscal year shall commence and end at the December meeting of each year, and the retiring Board shall settle the business of the previous year.

ART. 10. This constitution may be amended at any annual meeting by a majority of the members present.

BY-LAWS,

ADOPTED JANUARY, 1869.

1st. The officers of this Society shall be elected on the evening of the second day of the December meeting, annually.

2d. The officers of this Society shall hold their respective offices until their successors are elected and qualified, except the term of the office of Secretary, which shall terminate on the first Monday of April following, at which time he shall forward his books and papers to his successor.

3d. The President (and in case of his absence the Vice-President), Secretary and Treasurer shall constitute an Executive Committee, who shall perform any business deemed necessary for the Society in the absence of the Board.

4th. The annual membership shall cease on the day preceding the first day of the annual meeting of the Society in December.

5th. No person shall be eligible to the office of President, Vice-President, Secretary or Treasurer, who has not been a member of the Society three consecutive years previous to election.

6th. These by-laws may be amended at any general meeting of the Society by a vote of a two-thirds majority of members present.

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RESOLUTIONS.

1. Any plant that has been, or may be hereafter produced by State funds shall not be eligible for premiums offered by the Society on new fruits, etc.

2. That hereafter, before any superintendent of an experiment station can draw any compensation for his services, he shall be required to report to the annual meeting of this Society.

3. That the report of the twelve Directors of the State Society shall be condensed prior to publication by a committee of three appointed by the Society.

4. That hereafter, the reports of the Directors of the District Societies of the State shall be condensed by a committee prior to publication.

5. That hereafter, no paper or report shall occupy more than five pages of our annual volume.

6. That the four District Societies shall be allowed an equal sum for their support, and for the present the appropriation of each society is fixed at one hundred and fifty dollars ($150.00) annually.

7. That the sum of five hundred dollars ($500.00), or as much thereof as shall be needed, shall be appropriated for carrying on the work at the experiment stations in 1894.

8. That President Collman be empowered to appoint delegates to the meetings of the State Horticultural Societies of Missouri, Minnesota, Wisconsin, Illinois, and Nebraska.

9. That the reports of the Society shall not be sent to County or District Societies with an annual membership fee of less than one dollar.

10. That L. H. Pammel, J. L. Budd and N. E. Hansen be appointed a committee to report at the next annual meeting the scientific and most approved common names of our cultivated trees and shrubs.

11. That the time of annual meeting of the Society be changed for 1894 to the second Tuesday in December.

12. That J. G. Berryhill, O. L. Watrous and Silas Wilson be appointed a Committee on Legislation.

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PROCEEDINGS

OF THE

TWENTY-EIGHTH ANNUAL MEETING

OF THE

Iowa State Horticultural Society,

HELD AT

Des Moines, Iowa, November 21, 22, 23 and 24, 1893.

The Iowa State Horticultural Society convened for its twenty-eighth annual meeting, pursuant to notice, in the Horticultural rooms in State Capitol, at 10:30 A. M., November 21, 1893.

The meeting was called to order by the President, A. F. Collman, who remarked that in spite of the small fruit crop we have been blessed with a good degree of prosperity and have much to be thankful for.

Prayer was offered by President Collman.

J. S. Harris, of La Crescent, Minn., presented credentials as delegate from the Minnesota State Horticultural Society, and was elected an honorary member. Mr. Harris said:

It is too early in the session to make a flowery address. I am glad to be able to meet with you and learn more of your worthy efforts to introduce new fruits. We, in Minnesota, are all grateful to Iowa for Professor Budd's trip to Russia and the subsequent great advancement in prairie horticulture. It has been a great help to us, and we are full of hope. We are experimenting largely with the Russians and some are also raising seedlings. A large number

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of our members are enthusiastic experimenters, and are men of broad views. Most of them have other business to help them along. A few such men can do a great work in the cause of horticulture. A little leaven leaveneth the whole loaf. Our climate and soil produce fruit of high color and good quality. "Dig and delve" is our motto.

A short recess was now taken for renewal of membership. The regular program was now commenced by the reading of district reports.

DIRECTOR'S REPORT OF THIRD DISTRICT.

BY F. M. POWELL, GLENWOOD.

I have but few reports from counties comprising the third district. Mr. L. O. Williams writes me from Pottawattamie that the "Grape Growers' Shipping Association" of Council Bluffs has had favorable results from the co-operative method of shipping fruit. They handled 479½ cases of strawberries, average selling price being $3.12 per case; 1,050 cases raspberries at $3.10; 1,817 cases blackberries at $2.39, also a small number of cases of cherries, plums, currants and gooseberries. Thirty-three cars of grapes were sold by this association, giving a total of 94,814 baskets, average price per basket being .19.29. Total proceeds of all sales $26,321.37. It is estimated that they have handled about one-half the berries grown in the vicinity and two-thirds of the grapes, making the total estimate of berries in this part of the county amount to 5,700 cases; and the grapes amount to 142,000 baskets or more. The strawberry crop throughout the county was very light, less than one-half the average. Raspberries, fair average crop. Blackberries, about an average. Grapes fell short of expectations; perhaps there was three-fourths of a full crop. The grape interest is rapidly increasing in extent and importance. Nearly one hundred acres were added to the grape plantations during the last spring; about two hundred acres planted to small fruits and orchards. Land is becoming more valuable each year, due to increased interest in fruit-growing.

Mr. G. E. Evertts, of Audubon, writes me from that county that the per cent of yield is as follows: Apples, 5 per cent; plums, 40 per cent; cherries, 10 per cent; grapes, 90 per cent; blackberries, 60 per cent; raspberries, 90 per cent; other varieties about 25 per cent; strawberries, 30 per cent; gooseberries, 10 per cent; currants, 25 per cent.

Mr. Silas Wilson, of Cass county, writes me that the fruit crop in their county was light this year. Strawberries being only about half a crop; blackberries, one-half crop; raspberries, fair crop; cherries, nearly a failure; apples, 15 per cent of a crop; grape crop very large and of a superior quality.

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Mr. Thomas Ellett, of Red Oak, writes me for Montgomery county, that small fruits of all sorts were about a full crop. Quality above the average. The yield about two per cent above home needs. Apple crop medium, both in quality and quantity. One per cent above home needs and shipped abroad; sales range from $2.90 to $3.50 per barrel on track. Montgomery county is leading strong on many new varieties of fruit sent out by Prof. Budd. Plums, peaches, pears, etc., a decided success.

Mr. Collman, of Adams county, reports: Small fruits a good crop. Apples about one-third of a crop. The frequent showers and warm sunshine, during the ripening season, tended to highly color the apple crop and bring out fine specimens of this fruit. Nursery stock gone into winter quarters in fine condition, which encourages us to anticipate a fine crop next year.

Information from Fremont county is that the apple crop was less than one-half. Small fruit about the same as in Mills. Much interest is manifested in planting orchards, especially the peach.

Mills county has to report 25 per cent, or more, of an apple crop. While the majority of the fruit was defective, some of it was of an especially superior quality. On the State farm there was half a crop or more of very fine apples, due, we think, to spraying. One shipper informs me that there were 2,600 barrels shipped from Glenwood this season and fully as many more hauled in wagons to Council Bluffs and Omaha. The strawberry crop was exceedingly light, the vines having been killed by the severe winter. Mr. Van Horn, of Glenwood, however, was successful with his vines. On one and one-half acres he secured 3,500 quarts, due to special care of plants.

Grapes were of good quality and an average crop. I am informed that there were shipped from this station seventeen cars of grapes. Plums yielded perhaps 40 per cent of a full crop; cherries, about 10 per cent; other small fruits not more than half a crop, except raspberries, which may be placed at 75 per cent of a crop. One man sold from three quarters of an acre of raspberries $132 worth. These were grown among apple trees.

There was a fair crop of peaches in Mills county this year. Confidence exists that in the southern counties where there are timber belts, peaches can be raised in abundance with but little extra trouble. The growth of young trees has been excellent in our vicinity during the past season. The many young orchards planted during the past six years are beginning to assume sizes that indicate large yields in the near future. Planting has not been so extensive during the past two years as previous to that time, although large numbers of trees are annually planted. We take from the assessor's book for Glenwood township the following:

"Total number of trees in Glenwood township: Apples, 280,000; cherries, 940; plums, 230; peaches, 218; raspberries, 140 acres; blackberries, 8 acres; grapes, 90,000."

Land values, on account of fruit interest, are still holding up to good prices. I feel warranted in stating that for southern Iowa, the Duchess of Oldenburg is the most profitable for early market. The yield this year was nearly a full crop. The Ben Davis and Jonathan are still taking the lead for winter markets.

In view of the fact that these varieties invariably remunerate the investor beyond any other varieties, I cannot but advise the commercial planter to confine his planting to this limited number.

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DISCUSSION.

DR. POWELL: If I had had the same opinion of Oldenburg five years ago that I now have, as a profitable variety for market, I would have 10,000 trees of it planted instead of 1,000.

THE SECRETARY: Mr. W. C. Haviland, of Fort Dodge, has an orchard of 160 acres of Oldenburg. People ask, what are you going to do with them? Mr. Haviland states that a cold storage firm in Minneapolis has contracted his entire crop. In cold storage the Oldenburg becomes a winter apple. At the Tremont House in Chicago I found it used extensively last winter as a dessert apple. The fruit had lost much of its acidity and was good in quality. Its tenderness of flesh and juiciness made it superior to the hard and tough late winter varieties.

Cold storage, by the modern ammonia and compressed air system, is playing an important part in changing summer and fall varieties to winter. When removed from cold storage they remain firm and in good condition much longer than with the old ice system. Every neighborhood should have a cold storage house where ten thousand bushels of apples are grown. The New York grape-growers are making use of cold storage houses and refrigerator cars for supplying the western market. We can afford to co-operate in the same way in Iowa.

J. G. BERRYHILL: About 11,200,000 ten-pound baskets of grapes were shipped from the Chautauqua grape region the past season. Such vast quantities would be entirely without profit to the growers but for co-operative marketing. Here in Des Moines, with sixty to sixty-five thousand people, if we, as fruit growers, compete with each other the markets are certainly glutted. The surplus is peddled about the streets and prices go down. In order to relieve the glut it is necessary to co-operate and ship to distant markets. Shipments east and west are not so likely to prove profitable as north and south. The small grower markets his fruit in small quantities and must necessarily ship by express. But many growers together can ship in refrigerator cars attached to express trains. The present system is to ship to Chicago in car-load lots. The small towns then receive it from the large commission houses in Chicago. The fruit is necessarily deteriorated, much time is lost, and the cost increased. Unless we co-operate, small fruit and grape culture must necessarily be limited in Iowa. In New York the growers co-operate and by securing car-load rates are able to flood our western markets. We will by co-operation be able to do

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two things: First, ship to distant markets imperfectly supplied. Second, keep the home markets well supplied at all seasons by means of cold storage, the fruit being necessarily better than that shipped in by reason of less transportation.

W. H. GUILFORD: Those eastern grape men are not making a colossal fortune out of the business. In my home city of Dubuque a dealer had six to ten market wagons peddling ten-pound baskets of grapes as low as twenty-five cents retail. They cannot compete with Iowa growers if we adopt the same methods. In many of our rural districts not one family in five has a sufficient home supply of grapes, the vineyard generally consisting of a few vines competing, with more or less success, against tall weeds. It is our mission to encourage fruit culture about the home.

J. M. ELDER: In my home town at Concord, New York grapes sold as low as twenty cents per ten-pound basket.

G. B. BRACKETT: Prof. Fowler, of New York, told me at the World's Fair that in the Chautauqua grape region many were digging up grape vines and planting orchard fruits instead. Prices were ruling too low for profit.

DIRECTOR'S REPORT OF SECOND DISTRICT.

BY BEN MCCOY, OSKALOOSA.

While the interest in fruit-raising has abated but little in the Second District, the crops are not such that growers can take much courage from them. The apple crop in Mahaska county for the year 1893 was a failure, and this was the condition substantially all over the district. About the only good home-grown apples that I have seen this year was a half crop of matured perfect apples growing on fifteen twenty-year-old Stark trees. The trees were large and well developed, and in almost perfect state of preservation. The owner said this was the poorest crop they had ever given him since they were in bearing. A great many apple trees have been planted in the district in the last two years. Both years, however, have been very hard for starting and growing trees, and the losses have been comparatively heavy, which is a source of considerable discouragement, and which I fear will retard this interest somewhat. The grasshoppers have been indeed a burden to many young orchards, coming in as they seem to do from all over the place and staying until the trees are stripped of every vestige of leaves, these visits to be repeated again and again as soon as the trees heroically recover from these ravages.

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As to small fruit the crop runs all the way from a total failure, beginning with cherries, strawberries, raspberries, plums, blackberries, and running thus through the whole list to the grape crop, which was an average both in quantity and quality. I am in receipt of testimonials from growers of small fruit as to the value and efficiency of spraying, especially for grapes and plums, claiming that whatever they had this year they have thus saved from the general wreck.

I regret that I cannot report a general interest horticulturally, an interest that reaches out and takes hold of every owner of a plat of ground, however small, that he calls his home, and compels him to plant and care for fruit-bearing trees and vines. Fruit-raising is confined to entirely too narrow a limit. By dint of our own work, courage and enthusiasm, may we not widen it? Many who are trying to replace their old orchards do not have the courage to begin in a new place, but plant here and there in the sod of the old orchard, and meet with nothing but discouragement and defeat. Many like mistakes are made in planting small fruits. The lesson that the fruit-bearing tree cannot hustle in Iowa does not seem to have been generally learned. Much has been written and said about planting trees; more should be said about caring for them if we would eat of their rich fruitage. And the day would be hastened when the Directors of this Society, in making up their reports, would not have to glean from their advices as I have, from one of the best counties from a horticultural standpoint, in the Second District, wails like this:

> There seems to be a dearth of interest in the matter of Horticulture in this vicinity: in small fruit, noticeably strawberries, blackberries, raspberries, there are a few truck gardeners who are building up a good business, but as for apples, I much doubt if you could get enough for a baking of pies on any farm in this county, be they cross-bar, kiver-top or open face all apple.

I should perhaps add that all my advices report fine peaches grown in Iowa in the year 1893.

DISCUSSION.

B. F. FERRIS: Cultivation in my orchard, planted fifteen years ago, is still continued. I have never seen raspberries or blackberries dry out on the bushes if thoroughly cultivated. The best cultivation is highly important to secure the best results. This applies to all fruits.

C. G. PATTEN: I am now convinced of the necessity of shading the trunks of fruit trees. Even with the hardiest varieties I notice dark spots on the south side of the trunk, as though the bark were killed, and think it caused by the lack of circulation and excessive heat and drouth of the past two years. I intend, in a few days, to shade the south side of the trunks with evergreen limbs. I think that by thorough shading the lost vitality, caused by the drouth, can be restored. The orchard during this time has been reasonably well cultivated.

SILAS WILSON: I have had a limited experience with the Bokara

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peaches. I regard Bokara No. 3 as the most promising one I have and think it will pay to cultivate in southern Iowa. Good paying crops can be obtained three years out of five. The trees should be grown with low stems and on high ground. I have trees ten to twelve feet high, in open exposure, that endured 30° and 34° below zero and still came through in fine condition, blossomed and bore a few fine peaches the past season. I have been propagating and disseminating them for trial, but now feel more encouraged to push their propagation. Parties in Adair county, who have had good success with them, write me, Why don't you recommend those peaches? I exhibited some Bokara peaches at the Blue Grass Palace in 1891 that were eight and one-half inches in circumference. They were larger that year than usual. The quality is not equal to Crawford's Early, but good enough.

W. H. GUILFORD: I planted some Bokara peaches in 1887 and they have given me three crops and are now half dead. In the spring of 1892, when we had at Dubuque about twenty-three inches of rain in two months, the peach trees lost their leaves, as well as cherries and hardy apples, such as Haas. The peach trees were full of fruit, but put forth leaves again, and the peaches were half ripe October 1st. There were fifteen bushels on eighteen trees. The preceding year I had twelve bushels. This year a few fine specimens were obtained from a few live limbs.

J. C. FERRIS: Some farmers in northern Iowa have lately invested largely in peach trees claimed to reproduce themselves from seed. If they studied the subject they would not thus waste money. Let us be careful in recommending any peach, as peddlers take advantage of our recommendations and substitute worthless varieties. I heard of a hardy peach tree near my home in Hampton. Upon investigation I found the tree alive only beneath the snow-line, so did not cut scions.

W. H. GUILFORD: No nurseryman living in northern Iowa would recommend planting peach trees in that section. If a planter will buy Ohio varieties let him take the consequences.

A. F. COLLMAN: At the World's Fair in Chicago the Bokara peaches kept nearly as well as an apple. They were inclined to wilt instead of rotting. They are certainly a good thing.

M. J. WRAGG: In my district in Madison and eastern Adair counties and vicinity, the Bokara peaches Nos. 1, 2, 3 and 4, North China and Tong-pa have borne abundant crops the past three years on high, dry land. Bokara peaches from this district were shown

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at the State Fair in Des Moines and then were sent to the World's Fair. This indicates good shipping qualities, as reported by Mr. Collman. They will do for home planting.

W. H. GUILFORD: Are Bokara No. 3 and the Tong-pa identical?

M. J. WRAGG: No, sir.

G. B. BRACKETT: We should be careful in talking about the Chinese peaches, as they are generally very tender. The Tong-pa and Tong-pe peaches were introduced by Teas, of Indiana.

W. H. GUILFORD: My trees of these two varieties were all killed last winter.

THE SECRETARY: I have never said that the Bokara peaches would be perfectly hardy, but that they would prove about 30 per cent hardier than Hill's Chili or Wager, two of the hardiest varieties of the common peaches. They will extend the peach belt north about fifty miles. We obtained the pits from Bokara, about 300 miles north of Persia, the old home of the peach. We have sent out fourteen varieties from the Iowa Agricultural College, and they have been tested in Iowa, Illinois, Indiana, Kansas, Nebraska, Colorado and other states. The universal testimony is that they are about 30 per cent hardier than any of the old peaches. But they would need to be about 70 per cent hardier than the old peaches in order to be hardy in north Iowa. They should be planted on high land where they will have air drainage. At the college they stood well twelve years, but last winter were killed to the snow-line for the first time. In north Iowa they can be profitably grown by laying trees down in winter.

AFTERNOON SESSION—FIRST DAY.

Session opened at 1:30.

DIRECTOR'S REPORT OF SEVENTH DISTRICT.

BY B. SHONTZ, CORRECTIONVILLE.

The past year has been particularly unfavorable for the fruit-grower of the northwest, owing to the exceptionally dry season of a year ago. The

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apple crop, except in a few localities, was almost a failure; the Oldenburg, Wealthy, Haas, Iowa Blush, Sheriff and Plumb's Cider giving a fair yield. In all other varieties I found the fruit small and wormy.

Strawberries were only about half a crop. The berries were small owing to dry weather at the fruiting season, Beder Wood leading with Warfield and Captain Jack close up. Crescent, after the second picking, were almost a failure on my grounds.

Raspberries where protected gave a full crop, but where not were partially winter-killed, on my grounds all the varieties faring about the same. The Tyler, Ohio, Mammoth Cluster and Shaffer stood the winter about the same.

Blackberries, unless protected were a failure, the Snyder faring no better than other varieties.

Grapes were a full crop, selling cheap on the market. On my grounds the Worden did best, coming through the winter better than either Concord or Moore's Early.

The plum crop was almost a failure, the Pottawattamie and Weaver giving a fair crop; other varieties only a sample, as it were.

Farmers are becoming more interested in fruit culture, and are planting quite largely, especially of apples, cherries and plums. There will be a large increase in the planting of fruit trees throughout this district the coming spring.

DIRECTOR'S REPORT OF SIXTH DISTRICT.

BY M. J. WRAGG, WAUKEE.

The past season has been in many respects a repetition of last. The early part of the season was dry and cold up to the blooming period of most fruit; then we had a week of cold, rainy weather, which was unfavorable to distribution of pollen, to which I attribute the main cause of the failure of the apple crop. One thing was noticed, that after such a season as the past one, with reverses of cold and heat, and wet and dry weather, that the foliage of most all orchard fruits, plants and vines carried a remarkably good foliage throughout the growing period, and are going into the winter well ripened in wood.

Taking the apple crop as a whole in the Sixth District, it was not what would be called a one-fourth crop. Of early apples there was a good supply for home market of such sorts as Yellow Transparent, Oldenburg, Cole's Quince. Of fall varieties, very few, and the same applies to crab apples. Some winter apples, but of poor quality.

The cherry crop was also a failure, take it the district over. In some few cases we can report a partial crop. The cause of failure must be attributed to the killing of fruit buds during the month of March or earlier. Why the peach buds went through last winter with little or no hurt, and the cherry

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buds were killed by the same temperature, is a question that will have to be answered by some of our practical professors who are versed in horticultural lore. The facts are that in many places in this district the peach bore a full crop and in many places a partial crop. Mr. A. Murchut, a neighbor near Booneville, gathered over thirty bushels from a dozen trees. In many places around Winterset, Dexter and points in western Dallas and southern Guthrie counties the peach bore a good half crop. The Chinese and Russian sorts are promising well so far, being much hardier in tree and bud than the so-called hardy peaches that have been planted for the past ten years in this section. In quality of fruit they are not the best, but it is good. The varieties Tong-Pa and Bokara Nos. 1, 2 and 3, I procured and exhibited at our last State fair and then sent to the World's fair at Chicago. They were received in good condition after being packed ten days and also exhibited three days at the Iowa State fair. This surely speaks well for the keeping and shipping qualities of a peach.

Plums, as a rule, gave a fair crop. The Americana sorts which did best were Wolf, Wyant and De Soto. The Japan sorts that fruited the past season were Botan and Ogon. They are of the highest quality and the trees with us are perfectly hardy, yet I could not recommend them for general planting. The Russian sorts, as a rule, suffered from the curculio and gcuger. The Glass plum bore a light crop, but it is a plum of good quality, hardy in tree and one of the finest to plant, both as a fruit and ornamental tree.

The Stoddard plum, which is of the pure Americana type, bore a fair crop the past season, and had the recognition at the World's Fair of being one of the largest sent from Iowa.

For the past ten years we have had but little faith in the growing of pears in this and adjoining counties, but when we came to look over the district we found many sound trees from ten to fifteen years old, which have borne medium to heavy crops for the past two or three years. They are mostly of such sorts as Kieffer, Bartlett and Flemish Beauty, and with but one exception all the trees are found on high dry ground with no protection, having the best of air and root drainage. The soil where I find the best trees is very thin with a heavy clay soil near the top. If such is the ideal soil for the pear, why then we have hundreds of acres of just such soil all along and adjacent to our streams. The increased attention given to the planting of this noble fruit during the past few years makes this a question for our earnest consideration.

Blackberries gave us a good half crop, mostly of Snyder and Stone's Hardy. Ancient Briton is gaining in favor, but is grown in too small a way to report favorably. Minnewaski is promising.

Gooseberries were mostly a failure.

Strawberries made a good half crop, but the picking season was short owing to the want of rain at the proper time. Those giving best berries and extending picking season longest were Beder Wood, Warfield No. 2, Bubach No. 5. The Saunders and Parker Earle gave some fine fruit, but in quality the Haverland and Pearl came first the past season.

Currants gave a fine crop in most places. The sorts that are mostly planted and doing the best are Cherry, Victoria and White Grape.

Raspberries gave a good half crop. Shaffer was almost a failure caused

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by winter killing of the canes. Gregg did well, Ohio bore heavily, but fruit got very small the last pickings. Golden Queen is doing well and will be prized as a home berry. Older is doing well and I think is equal to or better than the Gregg. The Kansas is the best black cap fruited the past season; it gave the largest and most perfect berries, and lots of them to the bush.

Grapes were a large crop and mostly sold readily. Of course the bulk was Concord, but the best black grapes we saw were Moore's Early, Worden and Cottage; the best red was Brighton, which is being largely planted in parts of the district.

DISCUSSION.

J. S. HARRIS, of Minnesota: The apple crop in Minnesota was nearly a failure this year. Only Oldenburg and Wealthy bore to any extent, and these only on high ridges where they had air drainage. The foliage of many varieties was badly scabbed last year, so the trees could store no nutriment for a crop this year. The other Russian varieties bore very heavily last year and so the crop was very light this year. Strawberries were less than a one-fourth crop. Some damage was sustained from the false chinch bug. Beder Wood was one of the very best. Crescent did much better than Warfield. Lovett's Early and Bubach were good. Red and black raspberries were a magnificent crop. Nemaha and Shaffer bore best of varieties left without winter protection. At Minnesota City and on my place, the Shaffer without winter protection, bore better than Cuthbert with winter protection. Blackberries almost a total failure, even when laid down and protected. Grapes, wherever pruned reasonably early and laid down with or without covering, ripened well and were a No. 1 crop, better in quality than for the past ten years. Worden begins to go out of favor with us. It was all right this year, but last year the bulk of the berries dropped on the ground, when Concord held its fruit. It is best to go slow in recommending it for the main crop for market at the north.

R. D. MCGEEHON: The Beder Wood strawberry has paid me as well or better than any other self-fertilizer I have, and is a good fertilizer for all the pistillate varieties. With some growers in certain localities it appears to rust badly. Crescent does well everywhere. Jessie is not a success on my place; it does well on clay knolls and timber ridges, but on rich prairie soil it is worthless. The Beder Wood is a great plant-maker, and will mat too thick if planted close in the row.

J. S. HARRIS: The Jessie is worthless on my grounds at La Crescent Minnesota.

W. H. GUILFORD: The Beder Wood with me is a most prolific

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variety in fruit and plant. The leaves retain their color very late in the fall. It is a lazy man's strawberry, as it is a very vigorous plant and will hold its own against the weeds. Mr. Steinman thinks it is the same as Downer's Prolific, but I can not adopt this view. In Dubuque county everyone is planting Beder Wood. It is not as firm as Warfield, Captain Jack and Wilson, but is satisfactory in size, color, and flavor. I recommend it to my friends. This year my first ripe strawberry was a Beder Wood, on June 6th; June 10th furnished the first ripe Crescent, and the Beder Wood rows were scarlet, and the last ripe berry was also Beder Wood. It is not very firm but it ships pretty well.

THE SECRETARY: The Beder Wood I think is a seedling of Downer's Prolific, but they are by no means identical, although much alike in leaf, season and fruit. But Beder Wood is superior in every respect. In my private garden, I planted last year two rows 16 inches apart of Parker Earle and Warfield, on one side of a dead furrow filled with manure. On the other side of the furrow I planted rows of Beder Wood and Haverland 16 inches apart. From these four matted rows 90 feet long, we gathered this season over four bushels of berries. The manner of planting ensured perfect fertilization, and the manure supplied an abundance of plant food. Mr. Wragg spoke favorably of the Glass Seedling plum. This variety merits careful attention. It is an old variety and Downing describes it. The leaves are remarkably large, glassy, clean and perfect. The tree bears young and the fruit is good. I think it is a native of Transylvania. The Japan plums are not hardy in the sense that the Glass Seedling and our natives are hardy. In the test winters seven or eight years ago, the Japan plum trees were killed to the snow line, but the fruit is good and the wood unites well in top-working on native stocks. Top-grafts set two years ago bore finely this year. The Japan plums are not reliable in test winters. We have had many conflicting reports in the past five years as to the Shaffer raspberry. They are caused by the fact that it has a large leaf and roots near the surface, hence it fails in dry seasons unless given thorough cultivation. Chas. Root, of Hopkinton, in the midst of the drought sometimes cultivated as often as three times a week, and succeeded with the Shaffer raspberry as well as with blackberries.

N. T. CASE: Is the Japanese Wineberry valuable?

W. H. GUILFORD: It is simply a small, inferior raspberry with a husk.

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R. D. McGeehon: I secured plants of the Japanese Wineberry when first introduced about four years ago. It has killed back every winter since and last winter it killed root and branch. It is worthless.

The Society received an invitation to attend the exercises of the presentation of the portrait of Chief Justice Miller, to be held in Executive rooms at 2:30.

On motion the invitation was accepted and the Society adjourned. After the close of the exercises, the program was resumed.

COMMERCIAL ORCHARDING IN THE NORTHERN DISTRICT.

BY JOHN C. FERRIS, HAMPTON.

The northern fruit district of Iowa is probably the northwestern limit of successful commercial orcharding. Many efforts in that direction must be recorded as failures. For example, certain citizens of Cerro Gordo and Floyd counties invested about two thousand dollars in peach and pear trees. They were advised that these were reproducing seedlings, requiring no grafting and perfectly hardy. If they are planted the result will not encourage commercial orcharding in the northern district. Many other ventures will prove even more discouraging. Many apple orchards have been and will be planted as fruitlessly as these peach orchards, and the planters will smile in derision at the idea of commercial orcharding in northern Iowa. And yet I venture to say that no farming can be made more profitable, nor pursued with greater certainty of success, than intelligent commercial orcharding on suitable sites and soils in northern Iowa.

The requisites are elevated sites, clay soils, intelligent orchardists, honest nurserymen, careful, persistent effort and faith. No doubter will succeed. Yet faith must be based on experience and not upon the enthusiasm of specialists. The planter of untried specialties has fifty chances for failure to one chance for success.

The man who thinks apple trees are pretty much alike has no business planting apple trees at all, much less commercial orchards. But there is little danger that the uninformed will do more than experiment with eastern absurdities. The best informed will be the largest planters.

I must repeat the warning against many varieties in the commercial orchard. An orchard of Oldenburg in the vicinity of cold storage would be made very profitable. The two varieties, Oldenburg and Wealthy, with cold storage convenient, would supply excellent kitchen and dessert apples, and being reliable fruiters might be as profitable as anything that could be planted.

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In the absence of cold storage the best bearers of the Recumbent and Hibernal family might be substituted for Oldenburg, being fully as good in tree and a later apple. If quick returns are desired Kaump and Longfield would have a carload of apples as young as any two varieties of my acquaintance.

If winter apples are considered indispensable, top-grafting must be resorted to. Our orchards planted with Whitney, Virginia and Oldenburg, and top-grafted with Roman Stem, Scott's Winter and Melinda, might sometime become a very satisfactory and profitable orchard. But we of the north can hardly expect to compete with southwestern Iowa in producing winter apples. It is likely that the very early varieties will be most profitably grown in the north, and this will certainly be true when cold storage becomes general.

Of course, the south has many advantages not possessed by us. But we have certain things in our favor. We are near the great northwestern market. Mr. Haviland truly says there is not another such orchard between his and the north pole. We have fewer insect enemies. Given varieties keep much longer than the same grown in the south. They are higher in color and better in quality.

I will not attempt specific directions. If my suggestions serve to encourage intelligent effort I shall be glad. If any prefer the suggestions of foreign missionaries they can learn all about hardy peach and pear trees.

COMMERCIAL ORCHARDS.

BY M. J. GRAHAM, ADEL.

The first thing to be obtained is a suitable soil and situation. The land should be rolling, naturally well drained, with clay sub-soil; northern exposure preferred.

The trees should be first-class, two or three years old; some writers advocate the planting of one year, or "Maiden" trees, but the average planter will have better success with the two or three year trees, which have formed heads in the nursery.

The methods of planting have been so explicitly set forth in former reports of this Society, that it appears superfluous to refer to them at this time, except that I am in favor of close planting, that the trees may the better protect each other, and would intermingle the varieties to insure pollination of the blossoms. As to varieties, the safest plan is to adhere closely to the list of varieties which have best succeeded in the locality wherein one desires to plant, always adding a few of the most promising new sorts, for it is only by careful experimenting that we can find which are best adapted to our soil and situation.

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Although it has been the usual custom in reports under the head of "Commercial Orchards" to refer only to the apple, these remarks are designed to apply to all tree fruits grown in this section, as the planting of the pear, cherry and plum is also assuming commercial proportions.

The varieties of apples which have given the largest returns in this section during the past unfavorable season, are Oldenburg, Cole's Quince, Roman Stem, Rome Beauty, Rawle's Genet and Willow Twig.

Where the trees have attained sufficient age, pears have yielded good crops.

M. J. Wragg reports trees of Bartlett and Flemish Beauty in the eastern part of this county yielding about eight bushels per tree.

After careful investigation, Prof. Waite, of the Department of Agriculture, has found that the blossoms of Bartlett and many other of our best pears are imperfect and will not produce full crops of fruit unless planted near Flemish Beauty, Tyson, or other varieties having staminate or perfect blossoms. It is therefore probable that the yield of Bartlett in the above instance was due to the proximity of Flemish Beauty.

I would not, however, advocate the general planting of either Bartlett or Flemish Beauty, as the former is a short lived tree, and the fruit of the latter is subject to the scab.

Among other varieties much more reliable and better in quality, are Tyson, Clapp's Favorite, Howell, Sheldon, and Mt. Vernon, besides a number of seedlings of western origin that give promise of value for planting on almost any soil.

It is highly probable that pear growing, at least in the south half of the State, will soon emerge from the "experimental stage" and assume "commercial" proportions.

In plums, Lombard gave the best returns the past season. Wild Goose a light crop, and all varieties of *Americana* type were absolutely barren.

The cherry crop was a failure. Early Richmond and Montmorency *Ordinaire*, ten years in orchard, promise a heavy crop next year.

Bessarabian, Sklanka, Orel No's. 23 and 24 and Orel Sweet give promise of usefulness.

The pollination of blossoms, and spraying to ward off the attacks of insects and fungus diseases, are matters that will command the attention of the successful commercial orchardist of the future.

DISCUSSION.

G. B. Brackett: I am pleased to see Mr. Graham gives the correct names of varieties, as adopted by the American Pomological Society. Formerly the name "Duchess" was applied to a certain apple, pear and grape. The apple is now called Oldenburg, the pear Angouleme, and the grape Duchess. This new nomenclature obviates much misunderstanding and confusion, and should be followed strictly by every nurseryman and fruit-grower.

N. T. Case: Should top-grafting be done on the limbs or on the main stock of the tree?

B. F. Ferris: If the tree is subject to injury in the forks, the

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top-grafting must be done on the limbs. There is much evidence that top-working increases hardiness. Most of the half hardy varieties stand if on hardy stocks. The greatest difficulty is to select suitable stocks so as to secure a good union with no overgrowing of the top. In Illinois, failure in this respect has caused some trouble with breaking off of the top, otherwise good success has been attained with top-worked trees. Pewaukee top-worked on Transcendent has proven perfectly hardy, while root-grafted trees killed to the ground after the first crop. However, the Siberian crabs generally have not proven good stocks for the apple.

C. G. PATTEN: Mr. Ferris speaks of clay soils being the best for commercial orchards. Yet I have seen splendid orchards in northern Iowa on rich, strong prairie land, inclined to be moist, and rolling enough for drainage. We rarely have sandy subsoil, except along streams. In my locality the rule is a heavy and tenacious rather than a sandy subsoil. Tallman Sweet, and Golden Russet were successfully grown for many years on such soils. I have no doubt but that good orchards can be grown on any prairie rolls. The Northwestern Greening has proven entirely tender in northern Iowa as a root-graft, but top-grafted on a hardy stock it has not been injured. This is a most remarkable instance.

J. C. FERRIS: My experience with Northwestern Greening corroborates Mr. Patten's testimony.

J. S. HARRIS, of Minnesota: There is much discussion now regarding the Melinda apple. But it is very tardy in coming into bearing, as it takes about sixteen years to get half a peck of apples. Scott's winter is much better, and should take its place. Mr. Wilcox, of La Crosse, in southwest Wisconsin, has been very successful in top-grafting Scott's Winter on Transcendent; the union is good. He also has it on Hyslop. It bears in two or three years after being top-worked. The fruit is acid in early winter, but in March and April it becomes of good quality. Dr. Hoskins, of Vermont, planted many Scott's Winter alternately in orchard with Wealthy about sixteen years ago. The Wealthy trees are now all gone, but he has had car loads of fruit from the Scott's Winter.

THE SECRETARY: Scott's Winter has proven hardier in Iowa than Wealthy. We have grown it at Ames about seventeen years. When Wealthy wood was colored by the hard winters, the Scott's Winter remained perfect. Top-grafted on Hibernal, the Scott's Winter comes into very early bearing. It is satisfactory in productiveness, although not as heavy a bearer as Oldenburg. Top-grafting tends to early bearing and increased hardiness for a time.

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I have cut off the top of a one year apple seedling, grafted it on a bearing tree and it bore in two years. The grafting caused more or less constriction at the point of union. This, like wiring and ringing, tends to retain the elaborated sap, in the top, causing the mature condition of the wood essential to the production of fruit buds. I have found that the Jonathan, top-worked on hardy stocks, would endure very cold winters for the first three years. But later they were killed by winters of the same severity. I have also found Grimes Golden, top-worked on Oldenburg, perfectly hardy and early bearers for a few years, but later they were frozen off. The explanation is that at first the union was not perfect and the elaborated sap being retained in the top caused it to become well stored with nutriment. But later, as the return circulation became more perfect, normal conditions were restored, and the top proved tender in winters of no greater severity.

C. G. PATTEN: The Melinda is a tardy bearer on rich prairie soils, but this is not the case on lighter soils. I have seen trees nine and ten years planted, in heavier bearing than any Oldenburg or Wealthy. The soil was rather light, with bordering on a clay sub-soil. Dr. Hoskins sent me Magog and Scott's Winter, some years ago. I have discarded the Magog, but Scott's Winter appears hardier than Wealthy. In general, the recommendations of eastern growers are not safe for us, on account of the difference in climate. We must do our own experimenting.

N. T. CASE: In Des Moines, where I reside, the Transcendent and Hyslop blight very seriously, so they would not be suitable for stocks.

W. H. GUILFORD: The question of top-grafting is a very important one, and should be investigated at our experiment stations. Siberian crabs will not do for stocks, nor will any one stock be suitable for all varieties. The nature of the root system is an important factor. There is need of a consensus of experience and official expression of this Society as to what are the most suitable stocks.

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NEW VARIETIES OF SMALL FRUITS.

BY R. D. M'GEEHON, ATLANTIC.

No grower of small fruit plants can do justice to his customers without experimenting largely with the many new varieties that are offered for sale annually by scores of nurserymen *as the best yet produced.* Small fruits come into bearing so much sooner from seed than tree fruits, making it easy to flood the country with untried seedlings, claiming merit for them long before they are properly tested.

New Strawberries —In looking over the American Horticulturist report on Strawberries for 1893, I notice reports from about fifty experiment stations and prominent small fruit growers in about twenty states and in Canada. One experimental station reports on seventy-five new varieties, and only about eight of these have yet been catalogued. By noticing these reports closely from year to year, and comparing results in different localities, it gives us some idea as to what varieties will be successful the country over, and what varieties are only adapted to special soils. But we must test each variety for ourselves before we can know positively as to their adaptation to our soil and locality. A variety that will not produce a paying crop after three years' trial on good prairie soil with good cultivation, is not worth bothering with. If it does well *generally* all over the country, we may then conclude the market fruit grower can plant it with fair prospects of getting something for his labor. We find many varieties that produce a fair crop in favorable seasons, entirely worthless in such seasons as 1892 and 1893, while other varieties bear fair crops in the most unfavorable seasons.

Any variety that produced a fair crop in 1892 and 1893, we consider worthy of further trial. The weather was so unfavorable during blossoming time in these two years that many old standard, perfect-flowered varieties were so poorly fertilized that they produced but few perfect berries; hence we could not expect the pistillates to do as well.

The Parker Earle (s).—I have now fruited three years and find it one of the best (if not the very best) staminate variety I have yet tested. But it is a poor plant-maker and will not be profitable to the plant-grower unless he can get two or three times the price received for any standard variety. In order to get good fruiting rows plant it twice as thick in rows as Beder Wood or Warfield It has borne a good crop every year regardless of unfavorable seasons and conditions. It is the largest plant, with largest roots, of any strawberry I have grown, and is very easily transplanted. It is a good grower, healthy and hardy, will stand more drouth and abuse, and produce a good crop of marketable fruit, than any I have yet tested. Fruit medium to large, bright red, handsome, cone-shaped, with a slight neck, of

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good quality and moderately firm. It is immensely productive. I have counted on one plant fourteen fruit stems with from eight to twenty berries on each stem—over 200 berries on one plant. I have watched the reports on it closely for three years, and, having seen but one or two unfavorable reports in the whole country, I must conclude it does well about everywhere, so far as tested.

Gov. Hoard, *Woolverton* and *Saunders* (s), all staminate, we have fruited the last two years, and they have all done moderately well—but both seasons being so very unfavorable, we are not fully able to decide that any are valuable; neither do we consider them worthless until we have given them a fair chance, in a good season. They are all healthy and hardy, good strong growers, fruit large, handsome and of good quality.

Robinson (s).—This originated some years ago in Kansas. In growth and general appearance of plant, it resembles the Crescent, is healthy and hardy, makes plenty of plants, and, unfavorable as last season was it produced a good crop of perfect berries of good quality; berries somewhat larger than Crescent, handsome and firm, and in size held well up to last picking; season medium to late. In central Kansas, where it originated, they claim it is superseding all others as a fertilizer for pistillates on account of its productiveness, ability to stand drouth, and good shipping qualities. Taking into consideration the unfavorable season, it *certainly* promises to be one of our best staminate varieties for a profitable market berry.

Lovett (s).—This variety was sent out a few years ago by Mr. Lovett, of New Jersey, as Lovett's Early, and is said to be a cross of Crescent and Wilson; but now it is claimed to be a seedling of the Longfellow, and originated in Kentucky. With me it has proved to be healthy and hardy, a good grower, and last season it bore an excellent crop of good sized, firm, handsome fruit, of good quality. But as to earliness, it is not a success, being two days later than Crescent. From present appearance I would say it is well worthy of general trial at least.

Oregon Everbearing (s).—This had better be named *Neverbearing* as it has not borne enough of fruit in two years to give me one fair sample berry to test its quality.

Gillespie (s).—This is a seedling of Haverland and said in Ohio to be an improvement on that variety. But with me this year it was a total failure. It is a weak, delicate grower, making but a small number of plants, the foliage curls, and sunburns, and fifty plants set in the spring of 1892 did not produce a dozen berries. I shall not bother with it any more.

Shuster's Gem (p).—The plant is satisfactory in all respects, but the crop of fruit this off year was but small. It may do better on further trial. I shall not discard it yet.

Enhance (s).—This plant is satisfactory also in all respects. The fruit is large, irregular in form, dark red, firm, quite acid, lacking in quality, late in ripening; did not yield one-half the quantity of berries produced by Robinson or Lovett. I shall try this another year.

Boynton (p).—If this is not the Crescent under another name, it is so near it there is no need of both, hence I will discard it.

The Warfield, Beder Wood, Bubach and Jessie have all passed beyond the experimental stage, the latter not being a success generally on prairie soil but doing fairly well on timber land, while the former three are a success almost any where if given fair treatment.

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NEW RASPBERRIES.

Older.—We have watched this variety for seven years with much interest, and feel safe in saying that it is one of the best well tested black caps. I have some planted seven years ago that, from present appearance, are good for seven years more, while Tyler and Gregg, planted close by at the same time, are worn out and will have to be removed. The fruit in size, quality, and quantity, is all that could be reasonably desired. It ripens about four days later than Palmer or Tyler. The plant thus far is healthy, and one of the hardiest. The first season's growth from tips, is as rank as some others, but the second year it makes up for that. I have reports from reliable fruit growers in northern Illinois, Wisconsin, and many places in northern Iowa, all saying it is one of the best they have. I have not heard of it being damaged by the winter in any of these localities.

Kansas.—A seedling grown and introduced by A. H. Griesa, of Lawrence, Kansas. This variety I fruited this season for the first time and from the showing it makes on plants one year from tips I am well pleased with it. The fruit is nearly as large as Gregg, very firm, excellent quality, and we would say very productive. The plants produced from tips are about the largest and best rooted we ever saw. The growth and appearance of cane is very similar to Gregg, but not so stiff and easier to tip. It ripens about two days later than Tyler. From reports we see of it it is a success wherever tried, and from our experience with it we would advise all to try it.

Palmer.—We have had this in fruit three years and feel satisfied that it is the best *very early* black cap we have. It ripens with Tyler and Sanhegan. We consider it more productive, healthier and hardier than either, and believe it will soon supersede them.

Wade.—We got this from Indiana as being very productive, nearly as large as Gregg; firm, good quality, as early as Tyler. We find it lacks in all these points and consider it worthless when we have so many better varieties.

Japanese Wine Berry.—We got a few plants of this when first introduced. It kills down to the ground every winter, and last winter some of the plants killed out, root and branch. We have never yet seen a berry.

Erie Blackberry.—We have had this four years. The canes generally kill down to the ground each winter. A few fruited where protected. The fruit is large, jet black, about ten days later than Snyder and taste very much like an elder berry. The foliage has rusted badly the last two seasons and generally dropped off before frost. I do not consider it worth growing.

DISCUSSION.

THE SECRETARY: During the severe drouth at Ames the past season the Shuster Gem strawberry retained the most perfect foliage of all the many varieties tested.

W. H. GUILFORD: The Parker Earle strawberry has borne two very heavy crops on my place at Dubuque. They were given only common field culture, as I do not believe in petting a new variety. I have washed out the roots with a spray and find they go straight down, so we can hoe or cultivate very close without destroying the

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roots. It is a perfect berry for the hill system, as it makes but few runners. I do not regard it profitable for market, owing to its late season, which makes it compete with the early raspberries, but for family use I think it is very valuable. It is a very vigorous plant, with large fruit, and holds its own against weeds.

R. P. SPEER: In my judgment the character of the soil is an important factor in strawberry culture. Many varieties are profitable on certain soils, but fail on other soils in the same neighborhood. On my grounds at Cedar Falls the past two years Parker Earle has been one of my poorest varieties, while the Lady Rusk, which many growers find unprofitable, I find to be one of the best I have grown for years. Parker Earle gives only one good picking.

J. S. HARRIS, of Minnesota: Parker Earle is a good, vigorous plant with me, but yields only one good picking.

R. D. MCGEEHON: I have tested Parker Earle by giving it the most careless field culture and find it successful. It is very distinct in habit, a rank grower, with dark-colored foliage and many fruiting stems. I have tested it on different soils, including sandy spots.

G. B. BRACKETT: I am surprised at Capt. Speer's experience with Parker Earle, as my experience with it is as favorable as Mr. McGeehon's. The strawberry is local in its adaptation, and no fruit varies as much when grown on different soils. It is simply a question of soil and locality.

C. G. PATTEN: At Charles City the Parker Earle has done the poorest of all the strawberries I ever tested. It forms strong foliage but is not productive.

R. D. MCGEEHON: By the reports in the *American Horticulturist* from many states I find Parker Earle is succeeding on a large variety of soils.

J. G. BERRYHILL: At Des Moines I find the Parker Earle to be the strongest grower of a number of leading varieties. We set out three thousand last spring. The roots run very deep and it endures extreme drouth. It makes a strong plant but does not make many new plants. Warfield is a very prolific plant-maker, but is weak in habit.

W. H. GUILFORD: I have never heard a word of complaint against Parker Earle until to-day. Crescent has many friends but is not profitable with me.

J. C. FERRIS: I have never found a variety as productive as Crescent. I use Michel's Early for a fertilizer. Pistillate varieties

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are more productive than staminate. The production of pollen is an exhaustive process, and as pistillate varieties are free from this, they are in general more productive, and also hardier in blossom when exposed to late frosts.

R. D. McGeehon: This theory will hold good in a general way, but I begin to think that some staminate varieties, such as the Parker Earle, are about as good bearers as the pistillate. Parker Earle should be planted close in the row, as it does not make many plants. This variety is the latest of all with me and hence brings a higher price, even when raspberries were plentiful.

EVENING SESSION—FIRST DAY.

First in order was the annual address of the president.

PRESIDENT COLLMAN'S ADDRESS.

Ladies and Gentlemen:

Another year has been woven into the woof of time, and we meet again to consider the result of the past year and to plan for the future.

The past year has been an unusually discouraging one for the horticulturist. In many places the fruit crop was an entire failure, while in others about half a crop was harvested. But the frequent showers and bright sunshine in the southwest were favorable to the development of our fruit. Never in the history of our State, if ever in the history of our country, was there a table loaded with a hundred bushels of more highly colored apples than were shown on our tables during the late World's Fair at Chicago.

Thousands of visitors from the Atlantic to the Pacific, from the northern lakes to the southern gulf, as well as many intelligent men and women from the old world, were highly pleased with our beautiful apples, and were surprised to find that Iowa was at the head of the great fruit States of America.

We had in our exhibit 372 named varieties, 30 varieties unknown and seedlings, 25 varieties of crabs—making a total of 427 varieties. We have a record of them arranged in alphabetical order. We also have 30 varieties of grapes, 59 varieties of plums, 25 varieties of pears and 10 varieties of peaches, a list entirely too large for the planter as only a small per cent of the different varieties are profitable for general planting.

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Friends, to me this last is alarming! The unprincipled tree man has done our people a great injustice. It is our duty to educate our people. Our society is a State society supported by the people, and they have a claim on us that must be met, or it will only be a question of time when our support from the State will be greatly diminished, and our usefulness will only be found on the pages of history.

The fruit business in Iowa is no longer an experiment, but an established fact. We can grow better apples and more of them to the acre, than any other State in the Union. We are planting more trees than any other State. It is estimated that over $100,000,000 are invested in this State in horticulture. Our people are eager to get our reports, so we must make them more practical and get them before the people sooner.

Therefore, I recommend that a competent committee be elected in each district, whose duty it shall be to revise the fruit list and recommend only such fruits as are adapted to their locality. The time has been when this could not be done, but now it can be done, for we have certain varieties that are adapted to certain localities; then we have varieties that are a success in any part of our State. It is our duty to prepare such lists of fruits and scatter them broadcast over the State.

Again, I think the time has come when we should publish our own report. We can do it for less money and be a saving to the State, and we can get our report before the people much earlier, thereby being of greater value to the planter.

I have made it a point to look up the cost of printing our report and the rapidity with which it can be done. By this means I find that we can get our report before the people several months earlier. If this could be done, our report would be highly prized by every planter in the State.

The fruit business in the southwest part of our State is rapidly increasing. The small orchards have been made larger and farmers are planting large orchards on every farm.

The ridges that have been rated as second rate lands are being planted to fruit trees and are now our best lands.

Stop and think! Let us plant an acre of our land with trees. If we plant twenty-five feet each way, then we have about seventy trees to the acre.

Good home grown trees can be found a short distance from every planter and can be bought at living rates. So the cost of trees and planting an acre need not be over $15.00, and with good care in a few years the trees would richly reward the planter.

It is a very low estimate to have a tree bear two barrels of apples at the age of twelve years, and the low estimate of $4.00 per tree would aggregate $280.00 per acre. What can we do with our land that will pay us as well? But some will say the fruit business will be overdone and in a few years we will have no market for our fruit. My answer is, it would be a great blessing if the millions of hungry children all through our land could be supplied with good fruit. If you had stood with me at the fruit table the last three months of the World's Fair, and could have heard the people from all parts of the world pleading for apples, you would never stop to think what will we do for a market.

Having proper varieties of fruit and healthy trees to produce good fruit, the next thing is to prepare and market the fruit properly. The marketing

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of fruit is a great subject, and I shall not attempt in this address to go into details, but will offer a few suggestions.

First, the fruit should be picked carefully at the proper stage of development; it should be assorted carefully and packed in the best possible manner to have it keep well, bear transportation, and open up in attractive shape. Packing fruit for market is an art.

Fruit dealers generally prefer handling fruit that is well prepared and are willing to pay an extra price for perfect fruit.

So, friends, let us buy only good bearing varieties, and No. 1 trees; then plant well and care for the trees; then learn to handle and pack the fruit, and we will always have a market for all we can raise.

In closing, I wish to pay my tribute of respect to the people of Iowa, who stood by me so nobly during our exhibit at Chicago. I can never pay the debt of gratitude I owe the press and the people of our great State for valuable assistance and kind words spoken, but will always feel proud of Iowa.

ANNUAL REPORT OF THE SECRETARY.

In 1892 the conclusion was reached by a majority of our members and directors of the State and district societies that the light apple crop in the south half of the State was caused by the continued rains and cool weather of the blossoming period. Yet, as the rains in the north half of the State were quite as continuous, and the weather still cooler when the apple was in blossom, and the fruit crop was unusually abundant, we must search for for other causes.

The secretary last year said: "In view of the rapid increase of scab from the Atlantic to the Rocky Mountains, it is well to record the fact that the disease has not attacked the East European apples or their American seedlings. Even in New York and Michigan the necessity for breeding scab-proof varieties has been discussed. Beyond reasonable doubt the main cause of the failure of the apple crop in 1892 in Iowa and the states east of us was the attack of the scab in the blossoming period and through the season." This opinion is referred to at this time as it accounts for the light crop of the commercial varieties the past season, as the injured foliage and low vitality of the trees were not favorable for storing the cell structure of the wood with the needed starch for fruit bud development or fruit formation.

The failure of crop, in large part, of the scab-proof sorts in north Iowa was the natural result of a heavy crop in the very dry season of 1892. Even the Duchess, Whitney and Wealthy, that bore heavy crops in 1892, were fruitless in 1893.

That the scab of the commercial varieties had much to do with the shortage of 1893 over a large part of the Union, is evidenced by the fact that the perfect specimens at the World's Fair came from local sections where the soil conditions and air drainage in 1892 did not favor serious scab development, or were confined to scab-proof varieties which were fine irrespective

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of the points from which they came. Arkansas, Montana, Idaho, Washington and parts of Colorado, were able to show perfect specimens. This also was true of some of the high lands of Wisconsin, Illinois, Iowa and other States. Without the aid of the high lands and porous subsoils of Mills county and other parts of west and southwest Iowa, our Columbian exhibit would have been nearly confined to the fruits from east Europe and their American seedlings, and these were limited in number on account of the heavy crop of 1892.

Over the prairies east of the divide the cherry trees appeared to be loaded with fruit buds last spring, and when cut open they appeared to be in perfect condition. But they were tardy in opening, and when they finally expanded it was into *leaflets rather than blossoms*. This singular anomaly was evidently caused by the long continued drought of 1892. The fruit buds did not complete their development. We might conclude that the spot disease of leaf had something to do with it were it not for the fact that Bessarabian, Griotte du Nord and other sorts free from leaf troubles, behaved in the same way, in parts of the State with more favorable subsoil to endure extreme drought, and where they were favored with timely summer showers in 1892, the cherry crop was from fair to good.

Many varieties of the plum gave full crops, but in the prairie section of central Iowa the fruit was unusually small on account of shortage of water. With facilities for irrigation the crop would have been heavy. The varieties in the Iowa exhibit at Chicago came from parts of the State with more favorable subsoil, or from the parts with more rainfall.

The grape, in well cultivated vineyards, was well loaded with fruit in all parts of the State, but in the dry region of the black soiled prairies we had more rot and leaf troubles than usual. As with the stone fruits the World's Fair exhibit grapes came from the loess soils, the bluff deposits, or the local areas where summer showers aided the perfect development of the fruit.

The same has been true of the raspberry, blackberry and strawberry. In the prairie belts fair crops have only been gathered where high culture, manuring and summer mulching were given. On account of the cool weather in the blossoming period the strawberry has given by far the heaviest crops where the pistillate and perfect varieties were mingled in the rows.

State Ownership of Land.—The report of the Revenue Commission of the State of Iowa, has this suggestive statement: "The exemption, because of tree-culture, does not appear in the revised bill. However useful in purpose this exemption has served in the past, it is believed that at present the benefits to be derived from it are so insignificant, taken in connection with the improper avoidance of taxation it unfortunately too often facilitates, that its retention is not desirable."

Without doubt this ends our tree exemption law. The American Forestry Association has not of late years specially favored this kind of legislation. In practice such general provisions as tree exemptions, forest tree claim acts, etc., are taken advantage of by the unprincipled, and really accomplish but little for the encouragement of forestry planting.

This has been true in Europe and America. The real advancements over the world in this line have come from government and state ownership and wise management of forest areas, and in wise provisions for the planting of

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forests on lands not valuable for agricultural purposes. *The state of New York has made a move in this wise direction.* The state has purchased about half a million acres of denuded forest lands, and has appointed Col. Wm. Fox to the responsible position of State Forestry director. The intention is to obtain control of the lands of the state not profitable for agricultural purposes, and by planting and protection develop great forest areas for climatic modification. A main argument used in securing the passage of the act was that the land would rapidly increase in value, hence it would prove a profitable investment for the state, as well as its people. Pennsylvania has appointed a commission to investigate the need of such a law, to report the coming winter. The Rocky Mountain states and California are also moving in the same direction.

In Iowa we have over two million acres of sand prairie, sandy river bottoms, and light washy bluff lands, which have little value for agricultural uses. The pines succeed famously on the sandy lands, and the light washy bluff soils of the Cedar, Des Moines, and other streams of the State, will naturally spring into second timber growth if let alone and given favorable conditions. If New York can move in this wise direction, peerless and enterprising Iowa should at least take the matter under consideration. This society should at this session adopt resolutions favoring the purchase by the State of our least valuable lands, and the appointment of a forestry superintendent. A committee should also be appointed for the presentation of the subject to the proper legislative committee early in the session.

Annual Report.—Our annual report of 1892, is creditable to the society and the State. In its subject matter, and mechanical execution, we were proud of it at the World's Fair. Our foreign visitors expressed surprise that a State so recently the home of the buffalo should make such an exhibit of fruits, and publish an annual volume filled with papers and reports indicating thought and research in all the divisions of theoretic and practical horticulture and forestry. As known to the members we were able to publish 2,000 copies of the report in excess of our supply of recent years. This gives us a surplus of copies with our present regulations. I will respectfully suggest and recommend that copies be furnished to members of all our county societies who pay an annual membership fee of one dollar. The publishing of an appendix of one hundred and twenty-five pages of the proceedings of the Iowa Academy of Science, makes a bulky volume expensive to distribute by mail. It is also evident that our society is growing in membership and varied lines of work, hence we cannot reduce the number of pages given to our State and district societies. It is also true that the past two years we have been compelled to exclude the valuable reports of our many live and active county societies.

For these reasons I will again recommend the appointment of a committee to urge upon the legislature the need of separate publication of the valuable science reports.

Condensing Directors' Reports.—Last year the society passed resolutions favoring the condensing of the reports of the State and district directors by a committee appointed by the society. This committee should be appointed early in the session, as the work should be completed before the meeting adjourns.

Time of Annual Meeting.—At the World's Fair the statement was made

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by a number of our directors and members that our meeting on the third Tuesday in November is a violation of our organic law. This law was amended by the Twenty-third General Assembly as follows: "Said society shall hold its annual meeting each year for the transaction of its business at such time as may be fixed by said society."

For the reasons given last year the Secretary earnestly favors meeting earlier in the season than has been the custom since its organization. The change in the law was made to make this possible.

The Columbian Exhibit.—This will be officially reported, and I will only say that the Iowa apple exhibit under the auspices of the society and the Iowa commission astonished the people of our own State and other states of the union. But still more were the visitors from Europe surprised, as we had on our tables about two hundred more varieties than any other state or country, and they were fair specimens that would not discredit an exhibition table in a more favorable year.

The grape exhibit astonished even the writer in number and perfection of varieties. With the cold storage plants and refrigerator cars with which New York and southern Illinois are favored, we could have held up our grape exhibit to the close of the fair, as they were able to do.

FINANCIAL STATEMENT.

RECEIPTS.

Membership fees		$36.00

DISBURSEMENTS.

January 4, 1893, stamps	$ 4.00	
January 4, 1893, stamps	5.00	
February 13, circulars	3.00	
February 13, express	.25	
March 9, delivery of proof	1.00	
March 20, express	.30	
June 5, express	.90	
October 10, stamps	3.00	
October 11, stamps	1.00	
October 16, programs	8 50	
October 20, stamps	2.00	
November 3, stamps	2.00	
		$30.95
Due the Society		$ 5.05

J. L. BUDD,
Secretary.

On motion, the President's address and Secretary's report were received, and a committee appointed to consider and report upon the suggestions and recommendations contained therein.

J. G. Berryhill, Silas Wilson and C. F. Gardner were appoi nted as such committee.

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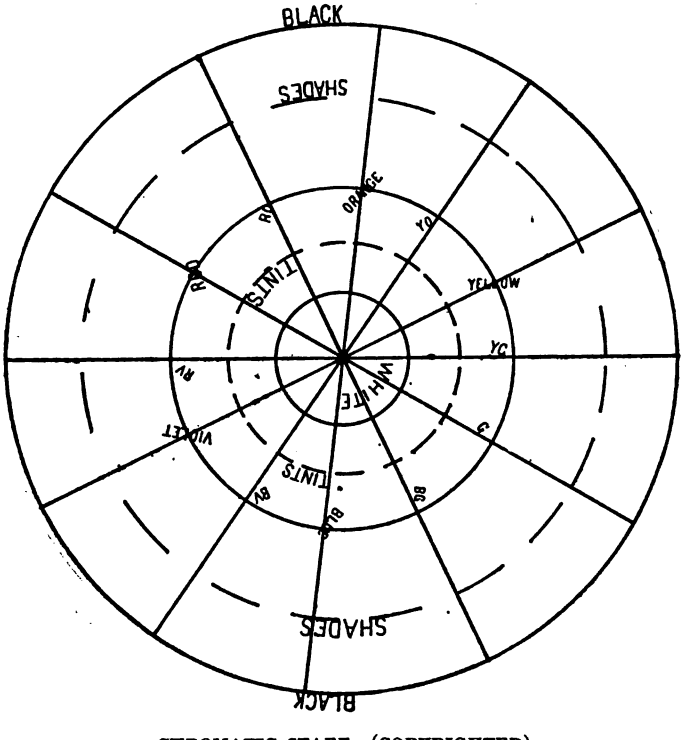
LAWS OF FLORAL COLORS.

BY MISS ETTA M. BUDD, AMES.

Why florists are unable to produce blue dahlias, roses and tulips, or yellow asters and verbenas, is an interesting problem for consideration. The dearth of literature and exact data make it an obscure question for discussion; but a comparative study of plant life and colors will develop many valuable points.

Physicists tell us that light and color are the result of wave forces acting directly or indirectly through median objects. From this standpoint our problem has two constant factors working in harmony: (1) These curious forces are generated in the same manner by the sun and ignited bodies. (2) The constant relationship of conditions in plant life tend to reflect a definite system of colors.

Chromatic Staff.—To show these relationships I have devised the Chromatic Staff, based upon the following principles: (1) Spectrum analysis



CHROMATIC STAEF—(COPYRIGHTED).

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separates the white sunlight into the following gradation of type colors: Red, red-orange, orange, yellow-orange, yellow, yellow-green, green, blue-green, blue, blue-violet, violet, and red-violet. (2) The same result, white, follows when each pair of seventh colors are combined. They are known as the complementary elements. On this framework the circle *a* represents white, *b* the spectrum colors in order, and *c* black. The space between *a* and *b* represents the gradation of tints; that between *b* and *c* the gradation of shades.

The term "*interval*" as used in this paper refers to the spaces between the type colors. For example, from yellow to yellow-green is one interval; from green to blue-green is another. They are numbered according to their distance from any given color.

Color pigments in plants are found in two distinct forms. First, blue, violet and a few white pigments are dissolved in the cell fluids. Second, the yellow, orange and red pigments are in granular masses, that are protoplasmic in their nature.

Prof. C. E. Bessey, in his book on "Structural Botany" says that alcoholic solutions of chlorophyl, or green pigment, can be separated chemically into two distinct powders, yellow and blue. In a private letter he stated that it was the verdict of modern scientists that these two colors were alkaline in their nature, and that the red and violet tints were either acid or contained acid salts.

As the result of some chemical process the yellow and blue pigments are separated from the chlorophyl and developed from the alkaline into the acid condition within a single natural order. These facts, combined with the phenomenal relations of color, has suggested the following law: *Opposite chemical and physical conditions tend to reflect complementary or seventh interval colors.* This being a new principle, we will spend more time in establishing its truth. As the chemical composition of pigments is unknown, the exact change that takes place in color development is obscure; but one fact is conclusively demonstrated, that the three elemental colors, red, yellow and blue, have never appeared in the same natural order. In a single order I found it a universal rule that either the blue or yellow was alone developed through one-half of the chromatic staff, or the two remained in their purity without developing into the red. This is exemplified (1) in the asters and clematis, where the blue principle is developed through the red into the complement orange; (2) the chrysanthemums, roses and tulips are developed from the yellow through the red into the purple tints; (3) the iris and pansies retain the blue and yellow, but have not been developed into the red. From these examples it seems to me that there can be two conclusions reached. First, the type colors, yellow or blue, can only be developed into opposite or acid conditions that would tend to reflect the complementary, or seventh interval colors. Therefore it will be a hopeless task to work for the third elemental color without destroying the original pigment. Second, in cases where yellow and blue are found in the same natural order, it may be possible, by special cultivation, to obtain the red. I found an approximate example of this in a pansy, that contained a decided orange-red. The stamens and pistil contain the yellow pigment that may run into orange, green or brown. In a few instances a purple shade is found in the stigma.

Seeds, as a rule, are the same tint or shade of brown or yellow, with an

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occasional black or purple The same principle is very marked in fruits. The unripe grapes vary from yellow-green to green; in the ripe stage we have a gradation of gray-violet and red colors prevailing. In apples the variation is from green to red, passing through yellow. The ripening of autumn foliage gives us a marvelously interesting example of the change from green into yellow and red.

Development of pigments.—Mr. R. L. Blair, of Des Moines, suggested that the principle of mixing pigments might be applied with advantage in originating valuable and showy flowers. With this view we made a comparative study of the crossed varieties and found much blundering work had been done. In many cases parent plants had been selected whose colors, according to the universal laws in mixing pigments, would produce crude and undesirable results.

In natural orders where other floral colors have been developed chemically from the yellow through red into purple, the yellow and red varieties may be crossed with admirable results; also yellow and orange, or white with yellow, orange, red or purple tints. The yellow and purple varieties are liable to combine and give an ugly brown pink. The reason for this may be the unlike chemical conditions, or the neutralizing effect of complementary colors. In orders developed from the blue type, it is best to cross varieties of a pure red and blue. The orange and blue tend to evil results.

Orders containing both the blue and yellow, the yellow and purple shades may be crossed with good results. The rich brown pansy is an admirable example, where the two pigments are mixed in the same cell.

From this standpoint I would suggest the following law as a guide: Parent plants should be selected whose flowers are either the elemental colors, red. yellow and blue, or a light tint and dark shade of the same color.

Prevalency of floral colors.—A comparison of the per cents of color found in the spectrum with the relative number of similar colors actually found in nature is valuable in explaining the difficulty of establishing the elemental red, yellow and blue.

A writer in the *American Florist*, in his dilemma and search for the pure color, says: "Nature abhors the commonplace. She despises crude red, yellow and blue." Nature may abhor these colors and they may be crude: but there are legitimate and scientific reasons for the limited number of these colors. First, it is difficult to stop the increasing chemical changes that would favor a reflection of pure red, yellow or blue. Second, from the table giving the per cents of color in the spectrum it will be found that there are only 54 parts of red, 54 of yellow and 56 of pure blue in 1,000 parts of white sunlight. With these two sets of conditions we could not expect numerous examples in our flowers.

Between the typical red and yellow there are 334 parts of orange. This and the fact that yellow is the most potent pigment, gives a satisfactory reason for the large per cent of floral colors found in this field. Although there is a small per cent of pure yellow in the white sunlight, the color is abundantly represented in plants, for two reasons. First, yellow is the most luminous spectrum color. Second, the pigment granules seem to be less susceptible to chemical changes. The last fact was admirably demonstrated in the samples of corn taken from the Cliff Dwellers' Ruins and exhibited at the recent World's Fair. They were almost as bright as specimens grown in later years.

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In the table we find 477 parts of yellow-green, green, and blue-green; consequently we would expect to find a corresponding number of examples in nature, and are not disappointed.

The small per cent of blue found in the spectrum, and the marked susceptibility of the fluid pigments to chemical changes, gives us a satisfactory reason for the limited number of blue flowers. These pigments are found in living tissues, but rapidly disappear in the ripening and decaying processes.

The purple and violet tints are more abundant, as they are midway in the stage of chemical development. They are also fugitive colors.

Richness of color.—It is a recognized physical law that light passing through a transparent medium with a reflecting surface beneath, will give off shaded colors that are richer. This principle is admirably demonstrated in the physiological structure of the colored portion of plants. The leaves and flowers have one or more layers of transparent cells, through which the light passes. It is there subjected to the absorbing and reflecting processes of the pigments and made still more beautiful and subdued by the white and gray reflections in the outer cells.

The numerous floral tints are caused by an excess of absorption and a feeble reflection of colors that unite with the white light in the epidermal cells. It is a universally recognized fact in art that white flowers are a myth. They are all tints of some color depending upon the internal structure and nature of the incident light. I might also add that white, on account of the peculiar requirements, should always be regarded as a relative term, and much more difficult to establish than elemental red, yellow or blue.

Plant markings.—In plant markings we have three classes of variegations: (1) Tints and shades of the same color; (2) colors separated by intermediate intervals; (3) colors separated by the complementary intervals. Combinations of tints and shades of the same color are perhaps the most common class of variegation, and is abundantly represented by flowers and foliage of familiar plants.

The third, fifth, seventh, ninth and eleventh intervals are frequently found in chord relations. The third class of markings is suggestive of a complete color composition, as it begins with the first and ends with the opposite, or complementary color. The yellow and purple markings of pansies, asters and iris are fine examples.

I have thus indicated a few laws governing floral colors with the hope that the spirit of original investigation along these lines may be increased.

On motion Miss Budd was tendered a vote of thanks and was made an honorary member.

R. P. SPEER: This paper is in the right direction. We need light on this very difficult subject, and I trust the investigations will be continued.

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WOMEN AS HORTICULTURISTS.

BY MRS. HERBERT OSBORN, AMES.

If it is true that he who makes two blades of grass grow where but one has grown is a benefactor to the human race, surely they who add to the world's supply of luscious, health-giving fruit and necessary vegetables, deserve no less the title, and those who successfully engage in any line of work advance its interests in some degree.

Is it not strange that woman, who in this era is pressing into every department of human endeavor, should have early recognized in the various lines of horticulture a field admirably adapted to her taste?

This occupation, unlike too many others into which women are drawn by natural ability or force of circumstances, need not necessarily remove her from home life. On the contrary, many phases of it may be conducted in connection with the home and prove of inestimable value to the family, both by material results and the elevating influence which an interest in nature and her works always exerts.

When we consider the dietary value of fresh fruit and vegetables it is astonishing that so many families in both country and town have an insufficient supply or else depend upon the too often stale offering of the market, when a small spot of earth might supply these necessaries in the best form. Busy men are wont to neglect the garden on the score of cost. Much hired labor brings the cost of home production above that of the marketed product.

Many a housewife takes the matter into her own hands and, by personal supervision and careful study, she is likely to solve it successfully.

Mrs. J. K. Macomber, of Des Moines, in addition to the care of a large family and many social duties, supplies her table with fruit and vegetables of her own raising, and each year the surplus from a small area gives a sum well worth the trouble.

Children are easily interested in such work, and a love for the beautiful, and habits of observation and industry, may be cultivated in this way more easily than in almost any other, while outdoor life brings its own reward in physical development.

Women readily find employment in florists' establishments and with seedsmen. They are preferred on account of their superior taste and attention to detail. Especially is this true in Europe, where outdoor work is more popular for women than in our own country. There the painstaking work of cross-fertilizing flowers is largely given over to them, as well as much labor which our own country women would hardly undertake.

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President Collman informs me that women gave much valuable assistance in preparing the horticultural exhibit of our own and other states for the recent exposition.

Iowa horticultural reports show the interest that Iowa women take in horticulture and the value of their work in many parts of the State.

In the May number of the *Californian Illustrated*, Maggie L. Brainard tells of some women who have been remarkably successful in commercial horticulture. Most of them have been southern women suddenly thrown on their own resources. They have succeeded by taking care to be first in the market, by neat and secure packing, by securing hardy trees and flowers, and by avoiding those liable to be infected by insect enemies or attacked by disease. One Mississippi woman has invented a method by which rosebuds are transported in water as far north as Peoria, Ill. She gets the highest prices for them.

She at one time raised a crop of radishes on a little plat of ground, thirty by sixty feet, which sold for over forty dollars. Early tomatoes, beans, peas and cucumbers have brought fine returns, as well as peaches and strawberries. She is careful to attend horticultural conventions, and neglects no means of information regarding markets. She reaps the reward of shrewd business methods.

A California woman's experience is equally interesting. She began with a raw wheat field and, after heavy losses through unfortunate selection of varieties, she finally obtained these results. "Of the original number of acres she has sold five, and has given her oldest son a ten-acre orchard in full bearing. Her home place now contains twenty-three acres, on which are planted 1,500 Tartarian cherries, 200 Napoleon Bigarrean cherries, and 406 Muir peaches, making 2,106 trees in all. Of these, 1,100 prune trees in bearing last season, netted her $2,700, and her cherries and apricots between $300 and $400 more. In addition to this, 300 young prune trees will come into bearing this year, and the cherries and apricots, which bore lightly last year, are promising a heavy crop.

Another California woman, left a widow with the wreck of a great fortune, bravely resolved to supply the San Francisco market with flowers. She now owns 140 acres of fine land, and she personally attends to every detail of its irrigation and cultivation, and to gathering, packing and shipping its products. This flower plantation is described as a perfect Eden. Seven acres are in orchards, five acres are in violets with an increase of fifteen more this fall These are her specialty, for which she receives $2.50 per dozen bunches. Seven acres are in chrysanthemums, and large areas are devoted to roses, lilies and other flowers. Two thousand eucalyptus trees and 3,000 other trees are very profitable, as the evergreen leaves and branches are used in decoration.

The writer cites another instance where a brave woman has made of a gopher and rabbit infested tract of land near Pasadena "a thing of beauty and a joy forever." Here she planted citrus, walnut and pomegranate trees and vines, built a comfortable house for herself and her invalid husband, and now has one of the finest places in California. Drives are shaded by vines, mulberries, maples, hawthorns, acacias, palms, yews, cedars and cypresses. Hedges are made of cypress, limes, pomegranates and roses.

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And then her vineyards, 43 kinds of imported varieties, as well as the principal American ones, numbering in all 13,000. Besides the citrus fruits her orchard contains apples, 30 varieties; plums, 25 varieties; persimmons, 12; mulberries, 10; and in addition to these, apricot, cherry, fig, guava, jujube, loquat, prunes, pears and peaches. Of small fruits she has 10 varieties, strawberry, raspberry and blackberry. Of nut trees there are English walnut, almond butternut, beechnut, chestnut, hickory, pecan and filbert.

Women often combine fruit growing with bee-keeping, poultry raising and kindred occupations. The most successful bee-keeper in Texas is a woman who is also a fruit grower of considerable note. These instances are but a few of many, but are sufficient to show the possibilities of fruit and flower growing for women.

Women writers on horticultural subjects are by no means rare. We find the results of their observation and experience in horticultural reports and periodicals. Notable among them was Mrs. Loudon, wife of the great horticulturist. With her husband she traveled through Europe in quest of information in this line. Besides her own independent writings she ably edited her husband's papers after his death, and prepared many of the cuts which illustrate them. Mrs. Lemon, of California, is also an able writer and authority on horticulture.

Much valuable drawing and microscopic work is done by women under direction. In fruit painting and making of fruit casts they excel. Prof. Budd tells me that the remarkable collection at Kew gardens is a woman's work. A Michigan woman displayed a set of paintings and casts in the horticultural building at the Columbian Exposition, which received much praise, and were pronounced, by good authorities, to be second to those of Mr. Brackett in excellence.

The study of horticulture seems to be gaining favor with women. In agricultural colleges they show an increasing interest in this branch of learning. At Ames it has become an established custom for a number of girls each year to take the lectures on horticulture. Two of the graduates, the Misses Mann of Algona, have laid the foundation for a nursery business. The people of their region do not believe it adapted to fruit growing. These enterprising girls intend to prove that it is if proper varieties are selected. They have already raised quantities of small fruits which find ready sale, In fact they can not supply the demand. England has a horticultural school for women. In Germany a benevolent woman of wealth and position has founded a school of gardening for women. The course of study is two years and the idea is that the student shall qualify for the post of head gardener on estates and in country houses. Girls are also received who wish to study gardening for their own homes. The school is well attended and the pupils work hard.

In Sweden, the Noerviken nursery school, has already several young women students. There are two classes, one and two years respectively. The two years' course is for those who intend to make nursery gardening a profession. The instruction is both theoretical and practical, and it is said the young women have shown no fear of manual labor.

It has been my purpose to show something of what woman has done for horticulture, and also something of what horticulture has done for woman.

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Anything which will induce American women to spend more time in outdoor exercise must be considered a blessing. Have we not here the ideal pursuit to accomplish this purpose, offering as an object — for an object she must have — recreation, food for thought and study, æsthetic pleasure, and last, but not always least, profit?

On motion Mrs. Osborn was made an honorary member.

DISCUSSION.

W. H. GUILFORD: Woman's love for horticulture has been shown in many ways. She has done wonders in the arts and sciences. The woman's building at the World's Fair was a revelation. The more we have of such papers the better.

A. F. COLLMAN: For the tasteful arrangement and decorations in the Iowa fruit display at the World's Fair, the real credit belongs to the many ladies who aided with their kind suggestions and advice.

FRUIT AS A DIET.

BY MRS. L. H. PAMMEL, AMES.

Gladstone says, "Nothing goes so far to prevent the terrible thirst which bad cookery and salted dishes cause to be chronic over half this country, as a free indulgence in the cheaper kinds of fruit." John Burroughs, who writes so entertainingly about the apple in his book, "Winter Sunshine," says: "Not a little of the sunshine in our northern winters is surely wrapped up in the apple. How could we winter over without it? How is life sweetened by its mild acids? A cellar well filled with apples is more valuable than a chamber filled with flax and wool. So much sound, ruddy life to draw upon, to strike one's roots down into, as it were."

The use of fruit as a diet by the human race, carries us back to ages before Christian civilization. The ancient Chinese, Greek and Roman writers mention the use of fruit as an article of human food. And the Book of all books, the Bible, frequently alludes to the use of fruit. But ages before this, long before any human hand has recorded any historical facts, fruit was extensively used as indicated by the material found along with the remains of the ancient Swiss and other lake dwellers. Our own aborigines relied extensively on the native fruits of this country. The blueberry, huckleberry, wild plums, etc., were used to a considerable extent.

We should pay more attention to fruit rations, since fruit is not only nutritious, but it is an antidote for many of the ailments that man is afflicted with. If persons are inclined to be sad and morose, fruit will stimulate the diet and add cheerfulness. Fruit is an excellent tonic and will stimulate

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digestion. It is a common saying, when a person's digestion is out of order they are inclined to be "out of sorts," or that "the liver is out of order." Now, nothing will correct this evil so quickly as a free use of fruit, which will quicken the torpid liver and invigorate the whole system. How refreshing is the first fruit of the season, the strawberry. "It snaps to the ear as it smacks to the tongue." What an excellent tonic it is. Again, how refreshing is a drink of lemonade during the heat of summer. Pimples, eruptions, and similar skin diseases that are not hereditary, may be cured in a very short time by a diet of laxative fruits, varied according to the season. It should not be understood that edible fruits exert direct medical effects, they simply encourage the natural processes. Under laxatives, oranges, figs, tamarinds, prunes, mulberries, dates, nectarines and plums may be included; grapes, peaches, strawberries, whortleberries, prickly pears, black currants and melon seeds under diuretics.

Taken in the morning an orange acts very decidedly as a laxative, sometimes acting as a purgative, and may generally be relied on. Apples are corrective, useful in nausea and seasickness. Barberries are very agreeable to fever patients in the form of a drink. Grapes and raisins are nutritive and demulcent and very grateful in the sick chamber. The juices of various fruits, especially of grapes, have long been used as drinks. Almost everyone has a liking for a mild, stimulating beverage. It has been found that the pure sweet juice of any fruit will entirely satisfy the normal appetite and furnish the desired stimulant, and also much nourishment, without leaving behind any injurious effect, as do wines and other fermented beverages. The juice, pure and simple, or sweetened to suit the taste, is heated boiling hot, then bottled and sealed air-tight to prevent fermentation. A glass of this juice given to a convalescent or invalid will refresh and strengthen him. The juice of the blackberry and of the grape are most valuable for invalids and that of the raspberry stands next.

It would be a saving of time and work, a promoter of health and pleasing varieties to bills of fare, if the housewife would supply her family abundantly with fruits in season at the table, not between meals With such a bountiful supply in the markets, it ought to be found on every table at least once a day. Much of the money spent for some kinds of meat had better be expended for fruit. A simple course of fruit after dinner is all that is needed, and is much more wholesome than pies. Ripe fruit is especially appropriate at the breakfast table, and can be taken before or after the principal dishes. Let your table be ornamented with what fruits are in season three times a day. There is nothing so ornamental to a table as a choice lot of apples, grapes, or oranges. The high color of a Spitzenberg apple suggests cheerfulness and health. Allow the family to help themselves whenever and as often as they may desire, before the soup, or after the principal dishes.

Milton says: "In what thou eatest and drinkest, seek from thence due nourishment, not gluttonous delight. So mayest thou live till like ripe fruit thou drop into thy mother's lap; or be with ease gathered, not harshly plucked, for death mature."

On motion, Mrs. Pammel was made an honorary member.

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ARE PLANTS HEALTHFUL IN LIVING ROOMS?

BY MISS MARY A. NICHOLS, STATE CENTRR.

There is no surer highroad to high thinking than plain living; no better security for lofty brain work, than a vigorous circulation; no stronger safeguard to sound statesmanship, than sound digestion. Alchemists have had their day. Pills and powders shall soon have had theirs. Hail to the advancing morn of the era of *Hygiene* — of prevention instead of cure — of

> "Health that mocks at doctor's rules,
> Knowledge never learned of schools."

And in the noontide of this day may we stand in a light so clear that every physical defect may appear as a hideous stigma — a badge of disgrace. We may indeed boast of a mighty stride toward higher civilization, when we shall have reached a plane whereon the women of our land shall be as much ashamed of chronic headaches as they are to-day of disordered dresses; as anxious to conceal organic disease as they are to-day to hide financial embarrassments. We can never become a healthy people until we wipe away the *fad* which to-day makes so many women shrink (unconsciously, perhaps), from an acknowledgement that they are perfectly well. We must *want* health before we can *have* it.

It is a propitious fact in this connection that organizations, like the one here assembled, are discussing these questions of hygienic import. For these organizations are representative of the masses, and as such are molding and directing the thought of the nation. The present condition of lack of health is a result of an aggregate of petty causes. Its cure lies in their removal, and their removal must come through a careful investigation, one by one, of the problems of correct living, and such application of the principles thus deduced, as shall make of every home a sanitarium.

Thus it is that the trivial question of the cultivation of house plants becomes of the greatest economic importance. We have long been taught that through the agency of plants the impure air exhaled by animals is purified and rendered fit for further use. But the facts upon which this theory is based need closer investigation.

The most prominent function of the living plant is the absorption of carbonic acid gas from the air. In the chlorophyl cells of the green leaves this gas is broken up into its elements, the carbon being assimilated by the plant and the oxygen returning free to the surrounding atmosphere. This action takes place only in the presence of strong sunlight and is a process not of respiration but of assimilation.

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It is these facts which have given rise to the popular theory of the beneficent effects of plants in the atmosphere. But while this process is the most prominent physiological function of plants, yet it is one of relative insignificance in comparison with animal activity. Max von Pettenkofer, in a series of experiments, has shown that twenty ordinary house plants under the most favorable circumstances would not absorb the $C O_2$ exhaled by one child. Couple with this the fact that assimilation is entirely stopped during the night, on cloudy days, or in any position excluded from direct sunlight, and we have fairly eliminated the probability of any practical results from this cause.

Moreover, M. Corenwinder asserts that in young plant life, including all buds and new growths, the material stored is nitrogenous rather than carbonaceous, and hence during this period of life there is no carbonic acid decomposed—no oxygen given off—but instead a regular process of respiration goes on, in which $C O_2$ is exhaled and oxygen absorbed.

This process of respiration, although less prominent than that of assimilation and partially concealed by the latter, is, nevertheless, a constant factor in all plant life. W. P. Wilson, in the *American Journal of Science*, says: "Oxygen respiration is a constant need of the living cell, be it plant or animal;" and this fact is acknowledged by all authorities. Unlike assimilation, respiration goes on under all conditions—under clouds as well as sunlight, in the night as well as day.

Wortmann, some years ago, tried to prove by a quantitative analysis of plant-expired air that the oxygen combined in the expired carbonic acid gas was not obtained from the atmosphere, but was due to a process which he called *intra-molecular* respiration. He confined three different specimens of Vicia Faba in as many jars, one containing oxygen, one nitrogen, and one hydrogen, and found no difference in the amount of $C O_2$ expired by the different plants during the time they were able to live in the negative gases. Wilson, later, however, proved that in this respect Vicia Faba is a marked exception to the general rule, and conclusively demonstrated that plants do absorb oxygen from the air in the regular process of respiration. This class of experiments leads to the conclusion that the air is very slightly, *if at all*, affected by natural processes of plant life and growth.

This conclusion is well supported by analysis of the air of different regions. The usual proportion of $C O_2$ in the atmosphere is about four parts in ten thousand, and this proportion varies little with circumstance or position. In tests made with air brought from every accessible point on the globe, no variation of more than about one part in ten thousand from the standard proportion has yet been discovered. In the selvas of the Amazon and the jungles of the Indies, the atmosphere is no more free from this poisonous gas than in the smoke-begrimed streets of Pittsburg or the crowded tenement districts of East London. Thus we are forced to abandon the ground so long held in defense of plant culture, and seek new arguments for the perpetuation of our favorites.

The production of ozone in the air by plant-growth has been urged as an element in favor of house culture. Of this process but little is as yet known. Pettenkofer, in summing up the researches which have extended into this subject, says that only negative results as to the value of ozone thus produced have as yet obtained. This was some years since. Of later experiments on the subject I have been able to find no record.

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We must then conclude in spite of our inclination to the contrary, that plants, through their influence upon the air, exert little or no direct influence upon physical health. But fortunately, there are other mediums through which the physique is reached. Life expands by contact with life. The inner consciousness instinctively leaps out to meet the unfolding leaf and budding flower. Responsive to this stimulus the blood bounds quickly through the veins; the heart throbs more eagerly at the touch; the lungs expand to the unconscious joy of this external life and growth.

On the sight of the over-burdened housewife, baffled by the chaos of conflicting cares, there bursts the quiet symmetry of perfect leaf and stem, and the tense nerves relax.

Before the over-heated brain of the man of accounts there appears the calm serenity of steady, constant growth, and from it there steals over him the healing balm of cool repose.

To those whose daily work is drudgery, whose lives are cast in unpleasant places of the world, a potted plant appears as an embodiment of purity and beauty — an inspiring tonic to the nauseated system.

And more than this! While physical health is of inestimable value as an attribute to the human *ego*, yet physical health alone, is barbarism. The perfect man is healthy physically but he is also healthy intellectually and spiritually.

Is there no starvation rife to-day save that due to the financial depression? No famine worse than the dread scourge which lately devasted Russia? Alas, where one mouth begs for bread to-day a score of souls ache dumbly for a taste of something beautiful. Where one man feels the tooth of hunger a hundred suffer from the stings of loathsome sights. Where one falters and falls for want of bread a thousand grope and stumble and fail utterly in life's purpose because the bread of spiritual life is not supplied—because from birth, yes, from generations back of birth, the power to enjoy, the faculty to appreciate, in short, the whole æsthetic sense has been dwarfed and crippled by disease. Not alone in poverty stricken tenements and miners' cabins, but in the more prosperous ranks of life, people are starving for something beautiful—starving to death—that awful death which no immortal qualities survive to make the lives around it richer, sweeter.

Are plants in living rooms a factor in this awful problem? Yes, they may help to arrest the famine, help to instill new energy into the sluggish veins of our spiritual life. Every household may build of plants and flowers its altar to the Beautiful It need not be with many plants—not enough to lay new burdens on one already over-taxed; not enough to shut the sunlight from the rooms; not a costly collection nor a bewildering variety; not those whose heavy fragrance stifles and oppresses; but one or two well cared for, thrifty, symmetrical, free from all dust and tokens of decay, fresh, inspiring, healthful, helpful and restful—teaching the lessons of life and growth, ministering to the wants of the body and soul. For such there is a place by every hearth-stone, and by the help of such

> "We build the ladder by which we rise
> From the lowly earth to the vaulted skies,'
> And we mount to the summit round by round."

On motion Miss Nichols was made an honorary member.

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NOTES ON STRAWBERRIES.

C. F. GARDNER: Instead of giving a paper on small fruits, I wish to call attention to a strawberry found growing wild on the border of an evergreen grove near Osage. It is a strongly staminate variety, with good fruit that ripens three or four days earlier than Crescent. It is superior to any variety I have seen.

R. D. MCGEEHON: I have tested a large number of varieties of strawberries from all parts of the country, but none of the seedlings of eastern origin have proven valuable. My most valuable varieties are all of western origin. This is an inducement for us to test all western seedlings. We should work at home instead of sending east.

J. C. FERRIS: Mr. G. A. Ivins, of Iowa Falls, has many choice seedling strawberries.

G. A. IVINS: I have been raising seedling strawberries for the last fifteen years and think I have several very promising ones. All my best seedlings are strongly staminate. Upwards of a thousand more will fruit next year. The seed should be sown in boxes of earth when ripe and allowed to freeze out doors all winter. In spring place boxes where somewhat shaded. The plants will be of proper size by August to set out in the field.

R. P. SPEER: The character of the flower should be studied in connection with the question of hardiness. Our hardiest and most productive apples have large, strongly developed flowers, with short pistils and stamens. A higher temperature is developed in such blossoms. Some varieties of the apple have comparatively weak blossoms, which are easily injured by frost.

R. D. MCGEEHON: This does not hold in the case of the strawberry. The largest and handsomest flower is borne by Jessie, and yet it is one of the earliest killed by frost; while Crescent and Warfield, with small and insignificant blossoms, are much hardier.

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FORENOON SESSION—SECOND DAY.

Session opened at 9:20.

Prof. L. H. Pammel, chairman of the committee on the preparation of a list of common and scientific names of trees, shrubs and plants, made a report of progress. The nature of the investigation is such that continued work is needed, hence I would suggest that we be permitted to continue the investigation another year.

DIRECTOR'S REPORT OF FIRST DISTRICT.

BY SAMUEL PARK, OTTUMWA.

I have not been able to obtain reports from all parts of the district, but those obtained are not very encouraging.

The strawberry crop was a partial failure, due to the long drouth of the summer and fall of 1892, and to the ravages of the white grub worm that cut off the plants at the surface of the ground leaving them dead. Hence but few new plants were grown for this year's crop. The grub worked mainly where the mulch was not removed after the fruiting.

The raspberry crop was the lightest I have known for many years. All varieties appeared to suffer alike. The oldest patches were nearly an entire failure, while the younger plants produced fair crops. My Shaffer did the best, although badly damaged; a wet spring and good cultivation giving an average crop. We think the Dewberry is a nuisance and should be so treated, but how to get rid of them is to me an unsolved problem.

Cherries, crabs, pears, gooseberries and currants were nearly an entire failure. A few were obtained in some localities. The same may be said of peaches and plums, though there was a partial crop of peaches in some favorable localities. These, however, were mostly seedlings, and of poor quality.

The blackberry crop was cut short by severe drouth and hot, southerly winds in August, about one-half being lost in this way. We have proved

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that heavy mulching will not save them when the hot winds come from the southwest.

Grapes were the best of all the fruit crops, and yet the oldest vineyards (Concords) are on the wane and some are almost gone. Evidently there is some disease affecting our oldest vines, and unless revived by some process they will soon be a thing of the past.

The Moore's Early and Worden grapes with us are a grand success; the latter has no equal for product and profit. I have fruited about forty varieties of grapes and must award these two the palm for profit, and yet I would plant the Concord for a later grape. From 350 five-year-old Worden vines I marketed 7,355 pounds of choice grapes, besides some destroyed by birds and some few stolen. We have found the shot gun the most efficient means to ward off these nightly depredators, and some of us about the city have resorted to this means to defend our vineyards from the young hoodlums that commit these petty thefts. After a little experience they whisper it about among themselves and shun such vineyards. We don't mean that we would shoot a man, but the report and the volley of shot naturally intimidate them.

The apple crop has been nearly a failure with other fruits, and the few we have are very imperfect. Fruit trees never presented a fairer prospect for a large crop than last spring. Nearly all varieties bloomed profusely and but for the frequent rains and chilling wind that were nearly at freezing point we would doubtless have had abundant crops.

DISCUSSION.

SAMUEL PARK: I desire information as to the cause of the failure in the vineyard referred to in my report. This Concord vineyard consists of one acre and has been planted twenty-four years. The last four years it has been failing until now the vines are nearly dead, especially those on the higher land. They are two weeks later in starting than those on lower land, and are very much less productive. The vineyard is a southeast slope on clay loam with a clay subsoil. Ten years ago stable manure was applied, six years ago a light dressing of coal ashes, since then wood ashes.

J. S. HARRIS: The trouble is due to a steel blue beetle that destroys the first buds in the spring. This lowers the vitality of the vines and in time will ruin them. We experienced this same trouble in Houston county, Minnesota, several years ago. The remedy adopted was jarring into cans of kerosene.

A. F. COLLMAN: While at Glenwood I saw Dr. Powell's vineyard on a steep north slope. It was the finest vineyard I had seen.

N. T. CASE: The general rule is to plant grape vines with rows running north and south. But now I plant east and west as I think the sun has better access to the fruit all day. My grapes on high land have done the best. The subsoil was sand so I planted them three feet deep, filling holes gradually as vines grew.

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R. D. McGeehon: From the description Mr. Park gives me of the Lucretia dewberry I learn that he has not had the genuine plants. My first plantation of this variety was one-half acre, but the vines were spurious and I dug them up. But I find it very difficult to exterminate them wholly. Later I secured genuine plants and I find them very productive and the fruit very large. The plants are not difficult to root out, if the ground is desired for other purposes. Some of the berries measure one and three-quarters inches in length and one inch in diameter at the base. A good average size is one inch in length and from five-eighths to three-fourths inch in diameter at the base. Mulch the vines in the fall with old rotten straw; in spring put the mulch *under* the vines to keep berries clean, and cut back vines to two feet in length; cultivate well through the summer and a good crop is certain.

SMALL FRUITS.

BY CHAS. ROOT, HOPKINTON.

Having been called upon to furnish a paper on this subject, I will simply give my own experience, hoping it may be helpful to some one.

Planting and Cultivation.—I have entirely abandoned all methods of planting except with the spade. Formerly I made furrows and planted raspberry and blackberry plants in them. While this is *quicker*, it is not satisfactory, as each individual plant does not get the attention it needs. Put every plant into the ground with as much care as if it was the *only one you had.* Do not let the roots of any plant get dry, or be exposed to the air or sun. My method is as follows; I have four half barrels (barrels sawed in the middle) containing water, distributed along the rows, about five rods apart. Into these are placed the plants, which are brought covered, in a two-wheeled cart, from the place where they are dug. Then the boy who drops them (no faster than the man with him can cover them) takes enough plants to plant the row till he reaches the next half barrel. By this method plants cannot get dry, and not one in a hundred will be lost if properly planted.

With red raspberries I have far better success with the young suckers coming up in the spring than with those of the previous year. I do not believe in fall planting of *anything*. In strawberry planting, especially with a spade, do not make the marks indicating the rows deep, as it is difficult to get the plant just the right depth in the ground when it is leveled. I use a light wheelbarrow to make the marks.

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Above all, use the best plants obtainable, regardless of price. Remember the cost of the plants for an acre of small fruit is a minor part of the expense required to bring the crop. Patient painstaking is required, mixed with good common sense at this point. Thoroughness from the beginning will secure success. One acre of strong plants on properly prepared soil is worth three acres planted with half-dead plants, of sorts that are not suited to your location, and neglected. Intensive farming in small fruits alone is profitable. I wish to emphasize this point. I have had bitter experience in this matter For the last five years I have succeeded in raising good crops of blackberries when others all around me failed. This year I cultivated my backberries twice each week all through the terrible drouth, and my berries were as large and luscious as last year or the year before. My berries were in demand for one hundred miles around. I had teams *waiting* for the pickers to bring them in; while around me acres yielded nothing, or a few hard, unpalatable berries. In dry weather, especially, keep the cultivator constantly going, weeds or no weeds.

Fertilizing the Soil.—I have found that if barnyard manure is used a crop of corn or potatoes ought to be planted the first year; although I have raised large crops of strawberries on fresh manure, it is not so safe. I have found that strawberries generally do as well with me on land that has been heavily manured two or three years before and cropped with corn and potatoes. My experience with artificial manures is not encouraging. Last year I used one ton of the best bone phosphate on one-half acre planted to strawberries. Along side of it I planted another one-half acre without. Both pieces had been planted for four years to red raspberries. There was no perceptible difference in growth through the summer, and at picking time no difference in quality or quantity of fruit. On a few rows I applied to the growing plants nitrate of soda at the rate of four hundred pounds to the acre (two applications). The effect in leaf growth was surprising. The deep green and luxuriant growth of those rows could be seen forty rods away. But though this spring these rows were by far the most luxuriant in leaf growth, they yielded neither more nor better fruit than either of the other pieces. I also used four hundred pounds of tankage from Sinclair & Co.'s slaughter houses at Cedar Rapids. Owing to the large per cent of nitrogen in this fertilizer the result was the same as the nitrate of soda, though not so marked. But the fruit showed no increase. I shall not cease experimenting yet, but so far have found nothing equal to barnyard manure.

Old and New Varieties.—I have discarded nearly all the older varieties of strawberries for profit except Warfield, Crescent and Haverland, with Beder Wood as staminate. Warfield is far in the lead. No berry with which I am acquainted has so many strong points. Its weak one is a tendency to rust, but I believe spraying with Bordeaux mixture will largely counteract that tendency. As a *very* strong pollenizer I believe the Beder Wood is the best we have. The fruit is of a bad color and soft, but there is an abundance of it. In my rows pollenized with Beder Wood the yield was perceptibly greater than in rows pollenized by any other staminate. Parker Earle is not profitable with me, and I have fruited it three years. It is such a poor plant-maker you cannot grow them for less than eight or ten dollars per thousand. The fruit is a bad color, and last pickings run smaller than Warfield.

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Of the sorts fruited for the first time this year, I enumerate Muskingum, Beverly, Middlefield, Princess, Lovett's Early, Standard, Gov. Hoard, Saunders, Martha, Williams, Fenton, Boynton, Woolverton, Shuster's Gem, Great Pacific, Barton's Eclipse. Of these, Muskingum is very promising. When ripening its fruit I never saw a more beautiful sight. The berries, carried on strong, erect stems, were so thick as to almost touch each other. The quality is fine; berries large and round, color about like Parker Earle. It is a strong, hardy plant, entirely free from rust, and stands dry weather better than any other of the new sorts enumerated. Lovett's Early also did fairly well. Beverly, with a long pointed berry, deep red, with very vigorous foliage, is worthy of further trial. Great Pacific proved a heavy cropper of berries of the Crescent type. Boynton is Crescent under another name; I could discover no difference either in fruit or foliage. The others I found to be inferior to dozens of my own seedlings. I wish to say, however, that this judgment is not final with me, as it takes more than one season to test a strawberry.

Of the sorts planted this spring I only wish to say that the new berry sent out for trial by Matthew Crawford this spring called No. 51, is in habit of growth and freedom from blight or rust, one of the finest I have ever grown. I sincerely hope its fruit in quality and quantity is as good.

In blackberries I doubt if the Snyder has yet been equaled. Ancient Briton so far has not done so well. The Snyder needs severe pruning in the spring to do its best, and must stay on at least two days after turning black. I sold Snyders this year in competition with the large Early Wilson from Michigan, shipped here in fine condition, with the result that my well ripened Snyders brought from two and one-half to three cents more per quart than the Early Wilson.

In raspberries I still depend on Gregg; also Cuthbert if it is not doomed on account of borers. The Older has a bad straggling habit, lacks vitality, and is far more inclined to anthracnose than Gregg.

Winter Protection.—I find in covering blackberries that canes more than four inches from the ground were badly injured unless covered entirely, while those close to the ground were comparatively uninjured. It seems a great task to cover entirely with dirt, and it is. Moreover, it digs such a deep trench between the rows as to be, I think, injurious. I have two acres covered entirely with dirt. Three acres I bent to the ground and covered with coarse manure, with enough dirt on top to keep it from blowing off. To do this I took out every sixth row, making a road for a wagon. It will also obviate wheeling in manure with a hand barrow, as I have done before, as it will be just what the bushes need. I think that blackberries ought to be manured every three years at least, as they are not prolific if left longer without it. Some tell me rabbits and mice will burrow under the manure and girdle the canes. But I have for two years done the same thing to a limited extent and suffered no loss. Papers tell us to cover strawberry vines with straw or hay after the ground is frozen to bear a loaded wagon. I believe this is a mistake. By that time the frequent severe frosts have severely injured the leaves. The leaves are the lungs of the plant. If they are injured the plant must renew them in the spring. This is more or less exhausting. I prefer to cover when the first severe frosts come. My rows come out as fresh and green as when growing in the summer. Root growth

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goes on just the same under the cover, as I have often found. Of course they must not be covered too deep. Just cover the rows so you cannot see the leaves. I covered mine the first and second of November. Of marketing I will say never send a box that is not ripe enough to put on your own table for supper. It is amazing how people will buy berries if they are thoroughly ripe, while half green berries will hurt sales for many days. Don't look for a distant market. Your home market is the best. In our little town of 800 people I sell from fifteen to eighteen hundred dollars' worth. In a town not ten miles distant by railroad, one merchant paid me nearly $1,000 for fruit this year. The demand will increase if we deserve it. There is nothing in this world more delicious than thoroughly ripened strawberries and blackberries. No one can resist the temptation to buy if they *know* they will find the berries the same all through the box and that all are *ripe*. I will not have a picker who will place the best berries on top of the box. We are not done with the customer when he pays for his box of berries and takes it home. You will hear from him the next day if he has found a lot of green berries at the bottom of his box. It is not honest and you will receive the justice you deserve. So let our motto be: Be honest with your plants—feed them, care for them and they will richly reward *you*, and if you are honest with your customers, you will be surprised how they will increase and your cash account grow.

Spraying.—My experience in spraying has been extended over three years, though not systematically till the past summer. Three years ago my strawberry vines were infested with the leaf rollers to such an extent as t. seriously affect the crop. I tried spraying with London purple, Paris green and kerosene emulsion. I found the London purple seriously injured the foliage, and that none of these preparations were of special benefit. Since then I have hardly found a roller on my vines. This I attribute to the operation of the general laws of equilibrium, by which, when a species increases inordinately, their parasites or diseases increase and destroy. The summer of 1892 was extremely favorable to fungus diseases. Two acres of black caps, soon after blooming, began to be seriously affected with raspberry anthracnose. I immediately began spraying with Bordeaux mixture, some weeks twice, as the rain washed it off. But I had my labor for my pains. The disease was not even checked, and I lost nearly the entire crop, and cut down the bushes and burned them. On two acres of Gregg raspberry, planted in the spring of 1892, I tried spraying the young canes. I found but little damage done in the fall, and this year they bore me a fine crop, for yearlings. This spring I began early, thoroughly drenching the whole two acres before the buds started, and gave them three sprayings at intervals of two weeks, as the young canes started, keeping them white with Bordeaux mixture. The result is, my two acres are almost entirely clear of anthracnose, having the deep blue color of healthy canes, and at this writing, Nov. 13, retaining a large part of their leaves. One isolated row of Greggs I did *not* spray, and they are ruined by this disease, showing me that the remedy for this disease is spraying. I also sprayed my strawberry vines twice, and never had vines so free from rust. My red raspberries, Cuthbert and Brandywine principally, were attacked by borers so fatally last year and this, that I have just finished cutting them out and burning them. Spraying with everything I could think of did no good. The worm is

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brownish white, about half an inch long, and will be found in September lodged in the pith of the cane. The same borer I found to a limited extent in some rows of Snyder blackberries adjacent to the raspberries burned. I should like to know how to fight this foe. If I cannot, red raspberries are at an end with me, unless parasites or disease destroy this insect as they did the strawberry roller.

DISCUSSION.

N. T. CASE: The general experience in the west is not to plant in the fall. However, there are some exceptions. Grape vines will generally do well if planted in the fall and well mulched during winter.

C. G. PATTEN: We have with us Mr. M. A. Thayer of Sparta, Wisconsin, delegate from the Wisconsin State Horticultural Society. He is growing small fruits successfully on an extensive scale.

M. A. THAYER: I commend the last paper very highly, and the main portions agree with my own experience; the points of difference being probably due to the difference in soils. The advice regarding the quality of plants cannot be too highly endorsed. As much care should be exercised in selecting plants for propagation as in selecting seeds and animals on the farm. To cultivate twice a week is good practice, especially in such dry seasons as the past two or three years. Our best blackberry in Wisconsin is the Ancient Briton. In strawberries Warfield takes the lead, although Jessie and Michel's Early do well. Nemaha is our best black raspberry. It is very similar to its parent, the Gregg, but the canes are more vigorous and hardy. Ohio and Gregg come next. Marlboro is our best red raspberry for profit, with Cuthbert for late. Our list is restricted for the reason that we must ship largely to markets from 300 to 500 miles distant, hence softer varieties are not available. In picking we need to anticipate ripening about twenty-four hours, so that the berries will arrive in good condition. The home market is good if available, but this varies with the locality. The anthracnose of the black raspberry is becoming a serious disease. There is no remedy, properly speaking, except to cut out and burn, but there is a preventive. We begin early, as stated in the paper, and spray the young growth with Bordeaux mixture.

R. D. MCGREEHON: What is the difference between Taylor's Prolific and Ancient Briton?

M. A. THAYER: I have no knowledge of the Taylor. Ancient Briton has lighter wood, with narrower and lighter colored foliage than Snyder; the berry is larger, and very sweet as soon as colored, better in quality, and more productive. It will ship three

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hundred miles in better condition than Snyder will one hundred. It is not as hardy in cane as Snyder, but that does not matter, as even the Snyder kills down to the snow line every year, and we are obliged to cover all varieties. I believe winter protection of small fruits is essential to success even as far south as central Iowa. Even where there is no apparent injury the vitality is lowered so as to greatly diminish the yield. I have laid down eighty acres this year and covered entirely with earth.

R. D. McGeehon: About fourteen years ago I planted Taylor's Prolific, and nine years ago I obtained Ancient Briton from Fort Atkinson, Wisconsin. They appear identical. One of my neighbors has what he is certain is Ancient Briton and he reports the oame similarity. It is much easier to lay down than the Snyder, swing to the tough, willowy canes. The canes are reddish not green as in Snyder.

M. A. Thayer: No doubt very many plants of other varieties have been sent out for Ancient Briton. Some very reliable men in Wisconsin have innocently sent out such plants.

RELATION OF SOIL AND CLIMATE TO IOWA HORTICULTURE.

BY PROF. D. A. KENT, AMES.

The elements of plant food are carbon, hydrogen, oxygen, nitrogen, sulphur, phosphorus, potassium, calcium, magnesium and iron. Hydrogen, oxygen and nitrogen are gases, the rest are solids. The three gases together with carbon are available in organic compounds, the rest in inorganic compounds. Carbon is chiefly available in the carbonic acid of the air. All these elements are in abundant and never failing supply for Iowa plants except nitrogen, phosphorus and potassium. Potassium and phosphorus can only be supplied by commercial fertilizers. Nitrogen is supplied by the various processes of nitrification in the air and soil. In the air through agency of electricity and rain water. In the soil through the agency of leguminous plants, putrefactive decomposition of animal or vegetable matter, action of lime with barnyard manure and chemical activity. Rain water supplies nitrogen in small quantity through the collection of ammonia. Including ammonia and nitric acid, the air supplies annually eight to ten pounds of nitrogen for every acre of land.

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Prof. G. P. Patrick gave me the results of an analysis of black loam taken to a foot depth, which is as follows:

Insoluble sand and silica	72.85
Silica soluble in alkali (hydrated silica)	8.29
Silica soluble in acid	.22
Iron oxide $Fe_2 O_3$	2.82
Aluminium $Al_2 O_3$	4.20
Lime Ca O	.82
Magnesia Mg O	.55
Soda $Na_2 O$	.12
Potash $K_2 O$	.41
Phosphoric acid $P_2 O_5$	.11
Sulphuric acid $H_2 S O_4$	.19
Chlorine	trace.
Volatile and organic matter	6.56
Total nitrogen	.20
	99.65

This analysis shows great abundance of the rare elements of plant food. An acre of loam taken to a depth of one foot will weigh about 4,600,000 pounds. Taking the per cents in the above analysis, we would have about 9,200 pounds of nitrogen, 5,000 pounds of phosphoric acid, and 19,000 pounds of potash. In pulpy fruits, analysis shows potash .8, phosphoric acid .3, and nitrogen .6 per cent; allowing five hundred bushels of apples per acre, there would be required 93 pounds of potash, 72 pounds of phosphoric acid, and 144 pounds of nitrogen. From these figures we have the conclusion that the above soil analysis shows that there is enough nitrogen in the soil to last seventy years, enough phosphoric acid to last seventy-five years, and enough potash to last one hundred years. So we need not worry much about the rare elements. It is apparent that it only requires judicious management of the soil to keep up its fertility.

The process of nitrification begins in bacterial activity, and develops by the formation of nitrates through the action of nitric acid on the lime, potash and soda of the soil. The conditions necessary to bacterial activity are heat, moisture and air. The horticulturist can greatly facilitate these conditions by drainage and cultivation.

Red Clover is the greatest nitrifying plant in present use in Iowa. In the south the Whippoorwill pea is the prevailing leguminous plant employed in orchard culture. This plant contains a larger per cent of protein than red clover, from which fact it may be inferred that it is a more potent nitrifier. It withstands drouth better than red clover, and yields two crops in one year. The second crop springs up voluntarily from the first. All kinds of domestic animals feed on the growing plants with great relish. Horses and cattle in the south prefer pea hay to clover and timothy.

The yield of forage per acre is large, being two to four tons. As has been already noted, our soil abounds richly in nutrient matter and it only remains for the nurseryman to manipulate it by drainage and cultivation as to cause it to unlock, as it were, sufficient vegetable aliment for each year's growth, and at the same time conserve the natural resources. Nature has been divided into an animal, vegetable and mineral kingdom, and made the

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animal kingdom dependent upon the vegetable, and the vegetable upon the mineral kingdom. But owing to the fact that plants can not utilize primary elements it would seem proper to designate a sub-kingdom in so far as alimentation is concerned. This would be the bacterial kingdom, whose function is the reduction or digestion of all organic matter, making it available as plant food.

Drainage is effected by laying mains and sub-mains in accordance with the general surface, and then laying laterals at right angles to these at a depth of five feet, and at a distance apart of sixty feet. To determine whether land needs drainage, sink trial pits with a post auger, and if the water rises within three feet of the surface at any time in the year, drainage is necessary. To determine whether the subsoil is capable of drainage, ascertain whether it susceptible of spading during the wet season of the year.

No nursery stock can flourish in a water-logged, sun-baked or turf-bound soil, all of which evils result from imperfect, natural or artificial drainage. A soil saturated with water in the spring of the year lowers its temperature ten degrees, drives out the air and thus chills and strangles young rootlets, causing knotty, fungus growths, which end in blight and general disease of the tree.

Cultivation is effected by plowing in May, or as soon as the ground is well dry, and spading those portions around the trees and out of reach of the plow, repeating the operation at frequent periods until September first. The cultivation should be level and six inches deep. Such treatment provides a soil mulch which conserves moisture, promotes aeration and narrows the extremes of wet and drouth.

The climatic problem is greater than the question of soil; in fact, climate makes soil. It is climatic influence that burns the surface of the earth into a desert waste or beautifies it with vegetation. It is climatic influence that accumulates the soil on the broad prairies or washes it to the ocean. It is climatic influence that withers and blights the orchard and harasses the horticulturist. The arid regions of our country yield in luxuriant abundance under the fostering agency of irrigation. The absence of precipitation in the Mississippi Valley would soon change her fertile fields to plains of shifting sands; or an increase in precipitation could easily denude the drift of its sheet of black mould and render our rich lands as infertile as the weather-beaten hills of the south.

The secret of our fertile prairies lies in the fact that the soluble elements are sealed with frost when half the annual precipitation falls; and much of the other half occurs in such small quantities as to only increase rather than diminish the fertile elements.

The average annual precipitation of only thirty-five inches evenly distributed throughout the year, gives to Iowa an abiding heritage that will forever enrich her sons, whether they glean as husbandmen in the nursery or on the farm.

Viewing the matter of feeding and maintaining horticultural plants from these standpoints, the important questions are the selection of hardy varieties, their acclimatization and such cultivation as will modify the extremes of climate. This matter of cultivation is effected, as has already been explained, by drainage and emulsification, either in the form of a soil mulch,

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straw mulch, sawdust mulch, or any kind of vegetable matter that will hold moisture.

Experiments have shown that twenty-two per cent more water will evaporate from a naked saturated soil than from the same condition of soil covered with the natural leaf and moss accumulation of the forest; and that twenty-seven per cent more of rain water will percolate through the leaf protected soil than through the naked one. So a mulch of whatever character is not only a retainer of moisture but a receiver.

DISCUSSION.

R. D. McGEEHON: I have used buckwheat the past fifteen years for shading the soil during the hot, dry season, and as a fertilizer. I plow it under when in blossom. It is one of the best pulverizers of the ground that I know of, and is excellent for covering land denuded of other crops.

B. F. FERRIS: Cultivating six inches deep is deeper than I practice. It would damage small fruits by cutting off the nitrogen feeding roots.

PROF. KENT: Deep and shallow cultivation are very indefinite terms. I am opposed to mere scratching of the soil for any crop. Such cultivation does not produce a soil mulch of sufficient depth to prevent caking of the solid ground beneath it. I do not mean by cultivating six inches deep that every particle of earth should be stirred to that depth. In ordinary cultivation six inches will give about four inches of mellow mulch, as there is always more or less impaction after cultivation. It is necessary to cultivate just deep enough to preserve a soil mulch of proper depth to conserve the soil water. This should vary with the season, and as the roots permeate the soil as the season advances, the cultivation should be shallower. The soil mulch produced by frequent cultivation breaks up the top of the capillary particles which, if undisturbed, would continue to transmit the water of the soil to the air, which process results in caking the surface by reason of the loss of water. Four inches of sand would form a perfect mulch.

ELMER REEVES: Would you recommend early fall plowing in a dry season?

PROF. KENT: I prefer to plow late in the fall for all crops. There are several points against early fall plowing, and only one in its favor, namely, weed destruction.

R. P. SPEER: I cannot agree as to the depth recommended for cultivation. In my experience of twenty-seven years in the nursery business I used for many years large shovels and cultivated deep. But in the last five or six years I used small shovels and

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harrow tooth cultivators. I would call five or six inches deep cultivation. The Albion Spring Tooth cultivator is the best I have used. On my soil I find it best to plow deep at intervals of five or six years, and then plow only five or six inches deep the intervening years. One spring I planted 225,000 apple root-grafts, half on fall plowing and the other half on land plowed in the spring. All grew well on the fall plowing, but the other lot made a poor stand and were all dead the next spring. Small fruits should be cultivated every week, if possible.

N. T. CASE: I find no difficulty in eradicating red raspberry sprouts by cultivation in one season. When the sprouts are six inches high I cut them off just beneath the surface with a diamond plow, turning two furrows together; then turn back later.

F. M. POWELL: Please explain the difference between drift and loess soils, and should the cultivation be varied for each?

PROF. KENT: Soil is such a detritus of rocks, mixed with sufficient organic matter, as will supply the elements of plant food. The surface soil of Iowa is largely a prairie loam, formed in place by the decomposition of vegetable matter, and therefore rich in plant food. As I indicated in the paper, it is a question of climate and not of soil. The bluff, drift and alluvial soil each afford the ash ingredients in great abundance for all horticultural plants. The difference between the loess, or bluff deposits, and drift, and alluvial, is as follows: The drift is the blue clay, yellow clay, boulders, sand and gravel that have been deposited over the surface of Iowa during the glacier period. The glaciers, you know, are the mills of the gods, that grind slowly but exceedingly fine. The bluff deposit is sedimentary and therefore finer yet than the drift, and contains ten per cent more sand than the drift but a great deal less clay, the amount contained being about one per cent. Were I to make a guess as to the process of this formation, I would suggest that at some remote period there was a great lake, whose shores were near the boundary lines of the present bluff deposit, and that this lake was a silt basin for the Missouri river. The surface of this lake, like Okoboji, laid very high. The muddy waters of the Missouri were discharged into it, and the clay or impalpable matter flowed on through the discharge of the lake, while the silt or heavier matter sank to the bottom until the lake was filled up. If a large river emptied its waters in Lake Okoboji and Spirit Lake, it would not take long to fill them with silt. The small amount of clay in this soil makes it less liable to impaction by drouth or improper cultivation, and to this extent it has a slight advantage over the

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drift or even alluvial soil. An alluvial soil is simply the wash of the hills lodged on the flood plains of the river valleys, differing from the bluff deposit in that the clay has been largely lodged with the silt.

M. A. THAYER: An essential to success in small fruit culture is green mulching. It has been my practice for many years to mulch blackberries and raspberries with green clover cut when in blossom. The mulch is applied in the line of the row and a space is left between the rows for cultivating. This year I used what would make fifty tons of good clover hay. To old farmers this seemed like vandalism. The advantages are: 1. It retains the moisture near the surface the same as a soil mulch. 2. It prevents growth of weeds. 3. It paid for itself as a fertilizer, the cost being less than hauling barnyard manure a mile or so. It assists materially in lessening the work of winter protection, the mulch being rotted by fall is used to cover the canes first then followed with earth. In the drouths of the last two or three years it has sometimes been difficult to get enough clover, then straw was used and it paid also. Why can not we ensure crops by the use of clover or other legumes? I experimented with buckwheat this year and found it excellent, but clover is better than anything else as a fertilizer.

R. P. SPEER: When I was at the Iowa Agricultural College I grew one year twenty of the most promising varieties of peas. All but two or three sorts "rusted" to such an extent as to make them worthless for any use.

PROF. KENT: The past season we grew on the College farm four varieties of Japan beans. They take very kindly to our soil and climate, and seem to promise to become a valuable crop for general cultivation.

DIRECTOR'S REPORT OF EIGHTH DISTRICT.

BY R. P. SPEER, CEDAR FALLS.

In the eighth horticultural district of Iowa home-grown apples were very scarce in 1892, and on drift soils in 1893 trees of nearly all varieties were unusually unproductive. In certain orchards the Oldenburg bore a half crop of fruit last summer, while in other orchards on adjoining farms nearly all of its fruit dropped prematurely. In my own orchard the Olden-

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burg bore half of a full crop of fruit on ground which was too wet frequently to produce a good crop of corn. Other varieties in my orchard produced fruit as nearly as I could determine by careful estimates as follows: Willow, on well drained ground, a full crop of good apples; on very wet ground it produced no fruit; on ground a little drier only a few very small, scabby apples; and on ground that was still drier but not well drained, a half crop of fruit, half of which were very small and scabby, while the other half were perfectly formed, but much smaller than Willow apples grown on well drained ground. My Tetofsky and St. Lawrence produced half of a full crop of fruit. Fameuse trees produced three-fourths of a full crop on well drained ground, and half of a full crop of smaller apples on ground that was only fairly well drained. Wealthy, top-grafted on Oldenburg, produced a full crop of large, smooth apples; while root-grafted Wealthy trees were so fruitful that the apples were small and worth much less than the apples on the top-grafted trees. Pewaukee on Haas produced only a few little, scabby apples which dropped prematurely, while other trees of this variety top-grafted on Oldenburg produced a full half crop of large, smooth apples, which remained on the trees until apple-picking time. Price's Sweet on Longworth's Sweet crab were very fruitful; while a dozen large Haas trees top-grafted with Price's Sweet produced no apples. Ben Davis, Black Oxford and Dyer, top-grafted on the Oldenburg, bore half a crop of apples of fair size and quality.

The following Russian varieties were heavily loaded with well developed apples, viz: Longfield, Arabka, Vassils' Largest, Noble Red Streak, Repka Kislaya, White Astrachan, Resonant, Anisette, Borovinka, Red Raspberry, Osfrosko, Silken Leaf, Alexander. The Martha, Whitney, Montreal Beauty and Briar's Sweet crabs were also very fruitful. Young trees of the following varieties just beginning to bear were as fruitful as Oldenburg and Ben Davis trees of the same age, viz: Juicy Krimtartar, Antonovka, Hibernal, Romna, Yellow Transparent, Gipsy Girl, Cross and Juicy Transparent, Grimes' Golden on Plumb's Cider and Cole's Quince on Perry Russet were fruitful, and the apples were of good size and quality. The following varieties produced only a sufficient number of apples to help me take premiums at the last State fair, and perhaps some premiums at our present meeting, viz: Perry Russet, Iowa Blush, Haas, Sweet Pear, Walbridge, Red Astrachan, Tallman's Sweet, Plumb's Cider and Longworth's Red. At our last State fair I exhibited seventy-two varieties of apples grown in my own orchards, on which I was awarded nineteen premiums, amounting to fifty-nine dollars. My orchards are on the north and south sides of the Cedar Falls and Waterloo road over which many people pass every day during the summer seasons, and after my apples began to approach maturity last August and September, hundreds of people have wondered why my apple trees were so full of fruit, while but little or no fruit was to be seen in other orchards. To many who have inquired for the cause of this difference I replied that I sowed clover in my orchard and manured my trees heavily, while the owners of other orchards did not do so. Oldenburg stocks top-worked with Wealthy make better trees in every respect than root-grafted Oldenburg or Wealthy. The Oldenburg is a good stock on which to graft Grimes Golden, Black Oxford, Dyer, Wealthy and many other varieties of the apple, but generally such trees require several years longer to come into full bearing

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than root-grafted trees. Girdling the trees during the first half of June is the remedy for this fault.

Plums.—My experience during the present and former years has convinced me that it will not pay to plant any of the Russian plums or cultivated varieties of plums of other countries on the drift soils of Iowa. Some of the Russian plums are sufficiently hardy, but their blossoms are very tender. On alluvial or bluff soils some of them may prove profitable. Native plums were very scarce in the drift soils of the Eighth district in 1893, and as usual the De Soto was the most fruitful and profitable variety.

Cherries.—A dozen or more of the Russian cherries are hardy enough for any part of northern Iowa, but only a few of them produce blossoms on our drift soils that are sufficiently hardy. The Spate Amarelle, Schatten Amarelle, Brusseler Braune, Nos. 23 and 24 Orel and Bessarabian are the varieties which have proved most reliable and profitable. My experience with cherry seedlings has caused me to believe that the cheapest and best way to get good cherries is to plant seedlings of the Spate Amarelle, No. 23 Orel, Bessarabian, etc.

None of the pears or apricots of any country can be grown profitably on the drift soils of northern Iowa, and even on our bluff soils none of them have proved satisfactory.

Blackberries were a failure in 1893 on account of summer drouth, except where they were well manured or heavily mulched.

Raspberries produced only a light crop of small berries where they had received only ordinary care, but where they had been carefully pruned and manured or mulched the crop was much better.

Generally the crops of strawberries were good, but certain varieties were much more profitable than others. On my farm the Rusk was best, but the Haverland, Beder Wood and Warfield were very fruitful and good. The Great Pacific, Parker Earle, Mrs. Cleveland, Michel's Early, Captain Jack, Cloud's Seedling, Bubach, Sharpless and Jessie were much less profitable than the four first named varieties. As fertilizers the Beder Wood and Jessie are the best.

The grape crop was large generally, but where poor care had been given to vines, many berries dropped prematurely or rotted on account of drouth. The Worden and Moore's Early have proved more satisfactory than other varieties. Last spring in Black Hawk and the adjoining counties there was a fair demand for trees of the Oldenburg, Wealthy, some of the Russian apples and the Whitney and Martha crabs, but no calls for American varieties.

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DIRECTOR'S REPORT OF NINTH DISTRICT.

BY B. F. FERRIS, HAMPTON.

It is a pleasure to report success and prosperity, and the reverse to report loss and failure. Making this report is an unpleasant task. Most of our fruit trees and plants wintered well, so far as could be seen; they made a fair growth, but produced very little fruit. Apple trees that bore bushels in 1892 were barren in 1893. Oldenburg, Wealthy, Kaump, Haas and Whitney bore some fruit. Oldenburg and Whitney were good specimens. Notwithstanding the unfavorable reports of the N. W. Greening, Salome and Melinda apple trees, thousands of them are being planted in northern Iowa, and they all appear to be doing well. They passed through last winter in good shape, and, if they do well after bearing, the two former should be largely planted.

But very few farmers seem to know anything of the doings of this society. They get their information mostly from the tree man of the road, and are apt to buy what he has to sell. The Salome comes from both east and west, and although it has perhaps never borne fruit in northern Iowa, it sells to many as well as the tried varieties. It showed about the same degree of injury last spring as Wealthy, Kaump, Patten's Greening, N. W. Greening, Iowa Blush, Walbridge, etc.

We had no cherries. Moore's Arctic and De Soto plum trees did very well, Wolf not so well. Blackberries were injured so much where not covered that they did nothing.

Raspberries bid fair to produce a full crop, but only matured about one-half what we expected They did not dry up on the vines, but fruit failed to set in proportion to blossoms. The Older is new to us, but so far as tried is superior to most old kinds. Hilborn fruited by side of Older, and did about as well. The Turner was the most profitable; Gregg and Shaffer about equal, Souhegan and Mammoth Cluster bringing up in the rear. Shaffer stood the winter better than Gregg.

Of grapes Worden, Moore's Early, Concord, Wilder, Victor, Delaware and almost all others bore well. The fruit was plenty and all early kinds sold for good prices. Later ones were crowded out by those shipped in and sold at very low prices. Very little mould appeared on any of them.

Currants were destroyed by the currant worm, yielding less than they have in ten years or more.

The faithful old Crescent strawberry has at last found its superior in the Warfield. The latter is well in the lead of pistillates with Crescent second and Bubach third. Michel's Early and Jessie are favorites among the old

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varieties of staminates. Beder Wood, so far as tried, is a favorite because of its being a staminate, its vigorous growth, strong plants, and fine crops of fruit of superior quality.

Evergreens are plenty and cheap. Norway Spruce and Scotch Pine are almost the only ones used for windbreaks. When planted together they make a perfect shelter. White Pines have all the merits of the Scotch except they require more time, are more easily broken by stock or snow and cost more.

Hard or Sugar Maple and White Elm are the favorite street trees. Weeping trees for ornament should perhaps have attention.

Tea's Weeping Mulberry and Wisconsin Weeping Willow succeed very well. The Kilmarnock Weeping Willow is planted every year, but is never a success.

DIRECTOR'S REPORT OF ELEVENTH DISTRICT.

BY ELMER REEVES, WAVERLY.

The report of the fruit crop and success and prospects for trees in the Eleventh district for 1893 must contain much that is discouraging as well as that which is encouraging. The winter was severe, but did not injure trees to the extent that was expected. The old varieties of apples were considerably damaged, but it was in consequence of the weakened condition in the fall. This condition resulted from injury to trees having thin leaves by the cold, backward spring of 1892. Oldenburg, Hibernal and most of the Russians were not injured, neither was Wealthy and most of the new seedlings that came under my notice.

The crop of apples was practically a failure. A few growers had apples to sell, but many who usually sell had not enough for home use.

There is a much better feeling among farmers regarding the planting of trees, and many are planning to set large orchards.

There were no cherries to speak of, and plums were a short crop in most places. There was plenty of bloom, but the weather was too cold and wet to allow fertilization. A protection on the north and east of the orchard would have proven of value the past two years.

Small fruit was usually about half a crop, but while some had a complete failure others had a good yield; and I know one grower who had a very large crop of strawberries. This was on timber land, and the strawberries were well cared for.

Raspberries were hurt by the winter. Gregg, Shaffer and others were badly hurt while Older stood uninjured. The crop of fruit was also cut short by dry weather which began in some localities as early as June. Blackberries were dried up and gave but little fruit and that of poor quality. Lack of proper care was the real cause in most cases, as proper cultivation and a

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slight mulch in the row at fruiting time would have matured a crop in fairly good shape. The Older raspberry is the popular black raspberry in our locality. Where its quality is well known purchasers ask for Older and my pickers will take no black raspberry except Older for their own use, preferring to go without berries rather than take Gregg, although the latter is the best shipper.

Grapes were a full crop and of good quality and sold at from three to six cents per pound which price caused a great many to be used. Currants and gooseberries were a short crop, and the call for improved sorts is increasing. Industry gooseberry has proven a failure with me, resulting from mildew, although the plants were kept mulched with prairie hay.

Of new fruits I will mention a seedling apple that closely resembles Melinda in appearance of fruit, but is a sour apple, while the Melinda is not. This seedling is a long keeper, having been kept in an ordinary cellar until apples matured again. The old tree is about twenty years old and is in good condition, while young trees in nursery appear to be well matured. There are also numerous seedlings of Oldenburg and other varieties that are now fruiting, some of which are very promising.

DIRECTOR'S REPORT OF TWELFTH DISTRICT.

BY J. M. ELDER, CONCORD.

The fruit crop in the north central portion of the State for the past year was little better than a failure. This was especially the case with tree fruits. The few apples were of inferior quality, while plums and cherries scarcely produced enough to distinguish varieties. On my own grounds, out of fourteen varieties of the plum, the Wolf alone was the producer of fruit.

The cause of the nearly total absence of bloom seems somewhat difficult of explanation. The winter was one of much snow, not particularly cold, and without marked features other than an unusually backward and stormy April Failures have occurred now two seasons with plums and cherries.

Grapes and raspberries produced full crops, while strawberries fell far below that mark, with no likelihood of improvement while the craze continues for the introduction of new, and in nearly every instance, worthless sorts. I know of no ground that has been more successfully worked by frauds, considering the amount involved, than with the strawberry. Large names and small berries have driven out most old and tried varieties, and given very little in return. We have few professional growers of small fruit in the north. If fruit is had it must come from the cultivation of hardy varieties that give liberal returns for the smallest amount of labor and care. When the Crescent, Downing, Captain Jack, Wilson's Albany and such

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others as have proven hardy in the past are discarded, and the scores of novelties now offered by the horticultural parasite substituted, the result is foretold.

Owing to the extremely dry season, I fear the death rate among the last spring's planting will be large.

The tree growth of the season has been large, and the wood appears well matured. The loss or injury from climatic causes appears unusually small; on the other hand, however, insect enemies were never worse. The presence of several heretofore unknown species was noticed.

The amount invested in nursery stock by our people increases with each succeeding year, and it is hoped the success of these investors will be commensurate with their zeal, yet such results can hardly be looked for, while ignorant and unreliable parties are dictating the purchases and furnishing the goods.

DISCUSSION.

J. M. ELDER: Our reports differ greatly as to the merits of the same variety. Varied soils and climates explain many differences of opinion. There is great need of local fruit lists that recognize these varying conditions.

C. G. PATTEN: Last year all tender varieties ripened their wood perfectly. Hence much caution should be exercised in reporting favorably such seasons on such varieties as Salome and Northwestern Greening, that have proven tender in less favorable seasons. Some of the Russian cherries recommended by Capt. Speer are not so successful with me. In my locality several varieties of plums would have borne well this season but for the drouth the last three years. Rockford has been the most productive with me the last three years. Hawkeye has endured the drouth far better than Wolf.

J. C. FERRIS: I do not think it necessary to top-work Wealthy on Oldenburg, as mentioned in Capt. Speer's report. It appears to be less productive and slower in coming into bearing, although fruit is larger than when grown on its own stock. But why should it keep longer?

W. H. GUILFORD: To what species does the Rockford plum belong?

C. G. PATTEN: The Rockford is a pure *Prunus Americana.*

B. F. FERRIS: At Hampton, near my place, a variety of German prune brought from Galena, Ill., has proven hardy and bears early. The trees are on their own roots. Early Red and Hungarian are perfect in tree, but the fruit is troubled with the gouger and curculio. Moldavka does not appear to be as hardy.

R. P. SPEER: In reply to Mr. Ferris' question will say that my

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Wealthy top-worked on Oldenburg are larger, hang to the trees better, and keep longer. Our summer drouths have the effect of premature ripening of winter varieties. Sometimes Jonathan is ripe and gone in October. Haas is sometimes overripe and gone before the first frost, and other years it will keep till the first of February. I have two thousand Wealthy trees coming into bearing, but do not like its habit of ripening and dropping prematurely. I am now mulching the orchard with clover by allowing it to remain on the ground. Some years I have girdled large Red Astrachan trees about June 10th, and the next year they would bear a heavy crop. In 1892 I girdled five large trees of Red Astrachan, but this year they did not bear an apple. They were standing in the mud, and could not appropriate sufficient plant food at the proper time. Trees on well drained ground blossomed profusely, while trees on wet ground did not blossom.

J. S. HARRIS: Does not the Wealthy have more fibrous roots near the surface, while those of Oldenburg go straight down with few fibres?

R. P. SPEER: Yes, sir. Probably that is the reason why my Wealthy trees top-grafted on Oldenburg matured larger and better fruit than root-grafted Wealthy trees, as mentioned in my report.

N. T. CASE: The Wisconsin Weeping Willow is mentioned in Mr. Ferris' report. In the vicinity of Des Moines there are many old trees of this variety from 18 to 24 inches in diameter. But they have not proven generally desirable, as many branches are broken as the trees attain size, and finally the weeping tendency is outgrown and the trees become erect. The finest specimen I know of is one growing on my place where it receives the wash from the pig pen.

B. F. FERRIS: I said in my report that Salome and Northwestern Greening passed through last winter as well as Wealthy. Perhaps this is not policy, but I only told the facts. I have no abiding faith in either, and believe they should be tried only in a small way.

W. H. GUILFORD: In my county peddlers have sold a great many Salome and St. Peter, but as far as I have seen they have delivered Wealthy trees instead.

J. C FERRIS: Salome has been found tender in northern Iowa by many. Some have planted Wealthy trees labeled Salome and so think them hardy. Northwestern Greening is tender as a root-grafted tree, but stands well when top-grafted on a hardier stock.

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ELMER REEVES: Last spring I had a fine lot of Melinda apple trees in nursery, but found them badly injured by the winter, and so burned them all up. Nine years ago last spring I secured two small trees of Salome, direct from the introducer, A. Bryant, of Illinois; one was in bad condition, and has since died; the other is still standing, and three years ago it bore one small apple; it was about the size of a good Hyslop crab, and was a very late keeper. I have no faith in the Salome for northern Iowa.

M. J. WRAGG: In my experience with the Salome and Northwestern Greening I find they cannot endure twenty degrees below zero. Last winter, at the Wisconsin State Horticultural Society meeting, at Madison, I heard the Northwestern Greening highly recommended. But their climate is not ours, the proximity to the lake influences the humidity of the air. At Madison I found many species of trees flourishing which we call only half-hardy, indicating that the climate is more like that of southern Iowa. The isothermal lines have many abrupt curves, and must be considered in studying the question of hardiness. In regard to plum culture, I think Rockford is one of the best natives in quality. Wolf is a valuable variety. Wyant is another one of our coming plums. In investigating the plum crop in Dallas, Greene, Guthrie and other counties in my district, I found that the stock used had more influence on size of crop than the locality. Trees budded or grafted on native (*Prunus Americana*) stocks gave a full crop. The crop was much less where trees were on peach or Marianna stocks, while it was a total failure where trees were on Myrobolan stocks. I regard the Myrobolan as a worthless stock for the plum in Iowa; it is not hardy, and the union is poor with our native plums, thus starving the top and making the tree short lived.

J. C. FERRIS: My trees of Kaump and Melinda had discolored twigs last winter, but grew right from the terminal bud. Kaump is somewhat larger than Longfield, about as late a keeper, and as early a bearer. I cannot supply the demand for Kaump apple trees.

J. S. HARRIS, of Minnesota: You gentlemen are wasting valuable time in bolstering up such varieties as Northwestern Greening and Melinda. Not a single tree of Melinda survived the winter of 1884-5 in my locality and the Northwestern Greening killed root and branch. At Ocontee, Wisconsin, where it is highly recommended, the climate is almost as favorable for apple trees as in Michigan. It does well along the lake shore, but both are worthless for northern Iowa.

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C. G. PATTEN: I wish to say a word in defense of the Melinda. In the past eighteen or twenty years it has been widely distributed in Floyd, Cerro Gordo and other counties in northern Iowa. We find trees alive where all others have been killed except Oldenburg. Last year they bore an immense crop, and this year as much as Oldenburg. Melinda is the hardiest *long keeping* apple we have found in northern Iowa. It is not a first-class apple, and rather an inferior tree in nursery. I am propagating it largely by top-grafting in the nursery.

A. F. COLLMAN: At the World's Fair I searched in vain for a single specimen of Salome, and found not a single man who recommended it. I regard it as a worthless variety.

The following were appointed as Committee on Fruit Display: M. J. Wragg, W. H. Shaul, F. E. Pease.

Adjourned to 1:30 P. M.

AFTERNOON SESSION—SECOND DAY.

Session opened at 2 P. M.

The treasurer's report was first in order:

TREASURER'S REPORT.

Iowa State Horticultural Society in account with SILAS WILSON, *Treasurer, Nov. 22, 1893:*

1893.		RECEIPTS.	
Jan.	18.	Cash on hand	$ 4.429.55
		Membership fees received	74.00
		By interest	75.00
May	19.	From Auditor of State	2,500.00
		Cash on hand	$ 7,078.55
Nov.	22.	Cash paid out	4,193.30
		Due Society	$ 2,885.25

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DISBURSEMENTS.

Jan.	20.	Premiums paid on fruit exhibit	$ 87.50
Jan.	20.	W. C. Haviland, expense and station work	25.25
Jan.	20.	M. E. Hinkley, expenses and station work	34.25
Jan.	20.	N. K. Fluke, expenses and station work	25.25
Jan.	20.	E. A. Goodwin, for services as janitor	8.00
Jan.	20.	Gen. Ed. Wright, librarian and custodian	100.00
Jan.	20.	John Wragg, station work and expenses	15.38
Jan.	20.	W. H. Guilford, expenses at meeting	30.40
Jan.	20.	R. P. Speer, expenses at meeting	21.70
Jan.	20.	W. J. Wragg, expenses at meeting	13.25
Jan.	20.	B. F. Ferris, expenses at meeting	25.00
Jan.	20.	C. L. Watrous, station work	11.50
Jan.	20.	H. W. Lathrop, expenses at meeting	18.77
Jan.	20	C. G. Patten, expenses and station work	41.75
Jan.	20.	C. G. Patten, attending Wisconsin meeting	13.50
Jan.	20.	George Van Houten, expenses and station work	25.50
Jan.	20.	George Van Houten, treasurer S. W. I. Hort. Soc	150.00
Jan.	20	D. A. Porterfield, treasurer E. I. Hort. Soc	150.00
Jna.	20.	J. C. Ferris, expenses and station work	35.00
Jan.	20.	N. E. Hansen, expenses	11.25
Jan.	20.	A. F. Collman, station work	9.00
Jan.	20.	A. F. Collman, expenses, stationery, etc	31.00
Jan.	20.	J. M. Elder, expenses as director	16.00
Jan.	20.	N. K. Fluke, stock for station	32.90
Jan.	20.	C. F. Gardner, expenses and station work	44.80
Jan.	20.	Christian Steinman, expenses as director	18.00
Jan.	20.	J. L. Budd, expenses and salary	396.36
Jan.	20.	Silas Wilson, expenses and station work	25.96
Jan.	20.	A. F. Collman, circulars for Society	2.00
Jan.	20.	G. B. Brackett, expenses on reports	33.62
Jan.	20.	G. B. Brackett, for station work	10.00
Jan.	20.	A. G. Williams, expenses and station work	18.34
Jan.	20.	Silas Wilson, salary as treasurer	100.00
Mar.	14.	B. Shontz, treasurer N. W. Hort. Soc	150.00
Mar.	17.	H. A. Terry, station work	10.00
Mar.	14.	A. G. Williams, expenses at summer meeting	4.62
Mar.	14.	Edson Gaylord, treasurer N. E. Hort. Soc	150.00
Feb.	20.	M. J. Wragg, expenses at Wisconsin meeting	43.90
May	17.	Silas Wilson, stock ordered by G. B. Brackett for station	72.82
May	30.	Silas Wilson, stock ordered by G. B. Brackett for station	59.00
June	14.	Gen. Ed. Wright, expenses and distribution of reports	100.42
June	14.	Herbert Osborn, for cuts	19.57
Aug.	3.	M. Crawford, for strawberry plants	6.80
Aug.	3.	O. A. Kenyon, station work	9.00
Aug.	3.	J. M. Elder, expenses summer meeting	15.00
Aug.	3.	M. E. Hinkley, expenses summer meeting	12.00
Aug.	3.	J. L. Budd, expenses summer meeting	4.75
Aug.	3.	R. P. Speer, expenses summer meeting	9.20
Aug.	3.	Silas Wilson, expenses summer meeting	7.50
Aug.	3.	A. F. Collman, expenses summer meeting	11.60
Aug.	3.	B. Shontz, expenses summer meeting	14.64
Aug.	3.	D. A. Porterfield, expenses summer meeting	7.65
Aug.	3.	M. J. Wragg, expenses summer meeting	3.60
June	13.	C. L. Watrous, for World's Fair expenses	600.00
July	3.	C. L. Watrous, for World's Fair expenses	300.00
Aug.	20.	A. F. Collman, for World's Fair expenses	200.00
Sept.	21.	A. F. Collman, for World's Fair expenses	300.00
Oct.	4.	A. F. Collman, for World's Fair expenses	500.00
		Total	$ 4,193.30

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J. M. Elder, Ben McCoy and C. F. Gardner were appointed a committee on treasurer's report.

The committee on president's address and secretary's report made the following report:

Your committee, to whom was referred the address of the president and the report of the secretary, would respectfully report the following:

Regarding the suggestion of the president, we would recommend that this society request the various auxiliary societies connected with this organization, namely, the Southeastern, the Northeastern, the Northwestern and the Southwestern Societies, to prepare fruit lists of such varieties as may be adapted to the conditions of their respective districts for culture therein, and that such lists be reported to the secretary of this society to be incorporated in the annual report.

In view of the fact that radical changes are to be suggested by this society with respect to the publication of the report of the Iowa Academy of Sciences, we do not deem it wise for the present for the society to ask the State legislature for a change in the law, whereby it would be authorized to assume the publication of its annual report. In view of the fact that the annual report will contain the fruit lists above referred to, and other valuable information with reference to planting and culture, we would respectfully urge upon the General Assembly the passage of a law, whereby the annual report of the society may be published and distributed by the 15th day of February following the annual meeting.

With respect to the recommendations made by the secretary we make the following suggestions:

That this society shall appeal to the Twenty-fifth General Assembly for the appointment of committees of the Senate and of the House of Representatives on the subject of forestry, and that the recommendations of the secretary with respect to said encouragement of forestry be referred to such committees for their careful consideration.

In view of the fact that our revenue laws provide for the exemption of fruit lands, for a series of years, from taxation, we would recommend that the legislature retain such provision in the code, notwithstanding the suggestions of the revenue commission. We do not consider that such statute has been abused, but do appreciate the fact that by reason of the lack of knowledge on the part of planters, such statute has not been taken advantage of to the encouragement of fruit culture.

In view of the fact that the proceedings of this society, together with those of its kindred organizations, namely, the district societies and the county organizations, will be quite extensive, necessitating the publication of a voluminous report of those proceedings, most of which will be of the utmost value to citizens of the State, and in view of the further fact that the report of the Iowa Academy of Sciences likewise contains much valuable material of interest not only to horticulturists, but to scientific and literary organizations as well, we earnestly recommend a provision of law for the publication of the report of the Iowa Academy of Sciences in an independent volume.

We would recommend that the matter of condensing the reports of the

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district directors be referred to the executive committee, with authority to make such revision thereof as may be by them deemed proper, prior to their publication in the annual report.

We further recommend that the president be authorized to appoint a legislative committee, composed of three members of the society upon whom shall devolve the duty of attending to the execution of the recommendations of the society by the General Assembly and the properly qualified officers of the State.

With respect to the annual meeting we recommend that the same be fixed for the second Tuesday in December of each year.

All of which is respectfully submitted.

JAMES G. BERRYHILL,
SILAS WILSON,
CHARLES F. GARDNER,
Committee.

On motion the report was taken up and adopted by sections, with considerable discussion.

Finally the report was adopted as a whole.

EVERGREENS FOR SHELTER BELTS.

BY C. F. GARDNER, OSAGE.

From my observations on this subject, I am of the opinion that, generally speaking, evergreens are not planted out in such a way as to get the full benefit of every tree used. I now have reference to their being set out expressly for a shelter belt, and for no other purpose.

Evergreens set out in a single row, with nothing to crowd them, will grow with limbs close to the ground, and form an impenetrable barrier against the wind, and will keep healthy and in perfect condition, even though set quite thickly in the row. The point of great importance to observe is that each row has plenty of room on each side. There should be absolutely nothing near them—no fences, other trees, or buildings of any description.

White Pine may be set twelve feet apart in the row; if more than one row is used, the distance between the rows should not be less than thirty or forty feet.

Norway Spruce should be set six or eight feet apart in the row and the rows at least twenty feet apart.

Scotch Pine and Norway Pine about the same distance apart as White Pine.

If spruces or firs are used, set them same as Norway Spruce.

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Trees set in this form will never drop the lower limbs; they will always be healthy. One row set as I have described is worth more as a wind-break than a dozen rows set in the common way close together. If set close, you may be sure that you are going to lose all the lower branches. This lets in a current of air next the ground, right where it is desired that no wind should penetrate.

Don't set two rows close together, thinking that if you "break joints," as it is called, you will get a better wind-break. This theory is a delusion and a snare. It will be found that in the course of a few years, just as soon as the trees begin to crowd, the lower branches on the inside will die and drop off. Evergreens set in forest plantations keep losing their lower limbs as the tree rises in height, except on the outside of the outside rows; so that a timber belt fifteen rods wide will stop no more wind than a good single row planted and grown as I have described.

On my grounds I have a single row of Red Cedar eighty rods long, sixteen or eighteen feet high, plants about two feet apart. The foliage is perfect from the ground up. It presents a solid, impenetrable obstacle to all winds. Also forty rods of Norway Spruce planted the same way and with the same results. I had a row of White Pine, trees about six feet apart, but it was through the center of our old nursery grounds and we were obliged to cut them down to make more room. They made as fine a shelter belt as I ever saw. Some of the trees were left and are now thirty to forty feet in height Some that have not been trimmed up cover a space fifteen feet in diameter on the ground. This shows that, if the rows were thirty feet apart, at their age the open space between the rows would be only fifteen feet, and this space would gradually diminish from year to year. One of my neighbors has a single row of American Arbor Vitæ thirty-five feet high that makes a perfect wall from the surface of the ground almost to the very top. To develop such a screen or shelter belt it is imperative that the rows should have plenty of room between them; they require a free circulation of air and a goodly portion of sunlight.

As to the variety to plant out, that will depend on individual taste. All the different varieties usually catalogued by the nurserymen of our State grow well and are perfectly hardy throughout northern Iowa.

In planting shelter belts I should put out the rows according to the amount of ground to spare for that purpose, but would consider three rows amply sufficient. The snow will stop and lay piled up on the inside with the highest side of the drift just inside of the outside row, the drift sloping off nearly to the second row. Norway Spruce is a good tree for the outside row, as the snow never pulls off the branches while it is melting and settling. The two inside rows will never be troubled with snow drifts. I say this on the supposition that the shelter belt encloses five or ten acres, either in the form of a square or circle, and that the land is level or nearly so.

The desire of every owner of a place should be to plant shelter belts, as far as possible, to harmonize with the natural landscape.

I conclude this subject by an extract from the writings of Bayard Taylor, in which he alludes most eloquently to the intelligent landscape gardener: "In his eyes all its features are, to a certain extent, plastic. That which he cannot change or remove, he can throw into perspective, or so conceal the

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intervention of other forms, that its individual ugliness shall become a component part of the general beauty. To contracted spaces he can impart a character of expansion; dead levels he breaks by picturesque interruptions; he works not alone for the eye, but excites the fancy by stolen glimpses which hint at some concealed charm. He collects the wondering rills, and opens a mirrored under-sky to brighten the too uniform green; he arranges his trees with regard to their forms and tints, to the lights they catch and the shadows they cast, until they stand as far in beauty above the uncultured woods, as the pediment groups of Grecian temples are above a group of ordinary men. He sees like the sculptor, the suggestions of nature and pilfers the graces of a hundred forms to blend them harmoniously in one ideal. Should not this 'Earth Sculpture' have its place among the fine arts?"

DISCUSSION.

MR. RADELEFF: How long time was required for the Red Cedars to attain the height given in the paper?

C. F. GARDNER: They are seventeen years old from the seed, and have been cut back twice.

W. H. GUILFORD: On Mr. Gardner's home place are thousands of beautiful evergreen trees, which are living examples of what great results can be attained by the prairie planter in planting evergreen for shade, shelter, and ornament and profit. We can do much to fence out the blizzards by proper planting of shelter belts. The usual method of planting several rows close together and "breaking joints," spoils all efficiency and beauty. The proper development of a hedge depends on a free access of air and sun to the lower limbs. Hence ample space should be given at the sides for lateral growth, and to prevent dying out at the base.

ELMER REEVES: I wish to endorse Mr. Guilford's statement as to the beauty of Mr. Gardner's home grounds. A perfect windbreak can be made of three rows two rods apart of Norway Spruce, with trees eight feet apart in the row. Such a shelter belt will make the temperature around the home that of the latitude one or two degrees further south.

B. F. FERRIS: With present prices for evergeens it is extravagant to plant three rows when one or two will answer equally well. I know of two fine windbreaks of Norway Spruce, twelve years old, consisting of two rows eight feet apart, breaking joints, and the trees eight feet apart in the rows. The trees have lost limbs on the inside, where they interlock, but are perfect on the outside from the ground up. The farm was sold for a much higher price than it would have brought without a windbreak.

C. F. GARDNER: My preference is a single row of Norway Spruce, with the trees four feet apart. There is then no dying off

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of the lower limbs, and the trees form a perfect wall. I know of such windbreaks twenty-five years old.

MR. PHILLIPS: Near East Des Moines I know of an old shelter belt consisting of four rows of Scotch Pine. The lower limbs have all dropped off, permitting the wind to have free passage. Another shelter belt, consisting of a single row of White Pine, is perfect. In groves White Pine has proven far superior to Scotch Pine, which gets dingy and open with age.

R. P. SPEER: After severe drouth I have noticed that Austrian Pine loses foliage. Last spring I got a box of Scotch Pine and they all died.

ELMER REEVES: I had the same experience with trees from the same source. I think they were pulled, rather than dug, the ground being covered with snow, and the roots stripped. There is a large block of Austrian Pine left standing on my father's place. The trees were planted for sale, but the demand being limited they were allowed to grow up. They are now very fine. Although a slower grower than Scotch Pine, it is a finer and more lasting tree when it attains some age.

J. C. FERRIS: My Scotch Pines planted in April all failed, while I had good success with planting the last of May and the first of June. The proper time to plant evergreens is in spring when the buds begin to start. This is the natural season for growth of root and top. If planted too early, they lose too much moisture by dry winds in early spring before they become well established. On the old Van Zant place, near Odebolt, in Sac county, the Austrian Pines are now much finer trees than the Scotch Pines. For a single row near the house, where it is the desire to combine beauty and usefulness, I would plant Austrian Pine.

C. F. GARDNER: Twelve years ago I set a row of Austrian Pine on the east side of my nursery. For the first five years they were red in the spring and people would ask the cause of it. The past two years they have not been affected by the winter in this manner, but I am beginning to grub out my Austrian Pine and planting Red Pine instead, which I regard as far superior. I want to close out my Austrian Pine and have quit propagating it.

J. C. FERRIS: I agree with Mr. Gardner as to the superiority of the Red Pine (*Pinus resinosa*). It is often called Norway Pine by the lumbermen, but this is a misnomer, as it is a native American species. It is one of our best evergreens and has long been neglected.

C. G. PATTEN: Last spring my early planting of Scotch Pine

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died, while success was had with later plantings. The trees were lowered in vitality from last year's drouth and were very late in starting. The season was dry and not favorable to proper root action by the early transplanted trees.

THE SECRETARY: Austrian Pine is much used in Europe for vine stakes and hop poles. I have found the timber quite durable for fence posts and fencing. If cut about July first, at the close of the bark peeling period, and dried thoroughly as quickly as possible, it is the most durable of the pines. This principle applies to all timber.

MR. MCLUEN: Twenty-three years ago I planted twelve trees each of Scotch, White and Austrian Pine. The Scotch Pines are now the largest and the Austrian the smallest and most inferior. Locality and soil have much to do with the successful culture of trees.

ROCKY MOUNTAIN CONIFERS.

BY M. E. HINKLEY, MARCUS.

I have only been able to prepare a few hasty notes on this subject, and this article might better be called, "How Mountain Evergreens Were Brought to Notice."

The first practical introducers of the western mountain trees were the mineral seekers. Satisfied or discouraged miners took specimens to their homes, and as these widely scattered trees developed into forms of beauty, the attention of botanists and nurserymen was drawn to them. This was in in the forties and fifties. The difficulty of success with many evergreens on the open prairies was an incitement to the grand search for something hardier.

Perhaps Robert Douglass should be rated as the Columbus who successfully turned public attention to the new world of western conifers. But he was not alone, and there are Lief Ericsons as well as botanical Vespuccis to contest for the honor.

Let us briefly note the beginning and development of interest in the Rocky Mountain trees in Iowa as shown by the records of this society.

The first mention is about 1877, when Dr. Parry, of Davenport, spoke before this society in praise of the Douglass and Menzies Spruces.

Dr. Parry, of Davenport, spoke before this society in praise of the Douglass and Menzies spruces.

At the same meeting Suel Foster pronounced the Norway Spruce by far the best evergreen to be had. (After sixteen years more of experience there will be many dissenters from that view).

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At the meeting of 1878 Mr. Patten called attention to the Silver Spruce of Colorado, and it appears from the discussion that samples of the tree were then widely distributed through the northern states.

G. H. Wright, of Sioux City, declared that "the climate of northwest Iowa was death to all evergreens, including those from the west, except the Scotch Pine."

Compare this statement with the facts of the present, and it proves either a climatic change, or that much time is necessary to make a thorough test.

In 1879 Samuel Bowers, of Cedar Rapids, declared before this society that "we need expect nothing of value from the Rockies unless it be some green-house shrub."

(Does not that sound curious in view of the experience of the intervening years?)

This ultramarine view evidently did not influence the society, for at the same meeting $100 was appropriated to "aid in the dissemination of desirable Rocky Mountain conifers."

At the meeting of January, 1880, Dr. Parry, of Davenport, made an able and interesting report on these trees. He confidently recommended the Engelmann, Douglass and Pungens Spruces, and the Concolor Fir for use in Iowa.

About this time the name "Menzies" for Pungens was dropped, and Silver, or Colorado Blue, adopted.

The same year Robert Douglass furnished this Society an account of his comprehensive work in experimenting with western evergreens, with its successes and failures. He urged the use of conifers from the eastern slopes of the Rockies, but condemned all from the western slopes. Plants of the four leading Rocky Mountain conifers were sent out. In such hasty research as I have been able to make, I cannot ascertain who received the plants of that first distribution, but there are intimations that they were sent to twelve different persons. If the society could now get careful reports of these experiments they would be valuable. Such is a brief outline of the manner in which Rocky Mountain Conifers were first brought to notice.

The chance work of the gold hunters, the scientific enthusiasm of botanists, and the business enterprise of nurserymen, have each played their part. Many facts have been established. Compared with the opinions of fifteen years since, we can see great progress made in correct views. Yet we have only traced the main features of our new world of mountain beauty. These species of trees all sport into varied forms. And the sports, and subvarieties of well-known types, are still unclassified and unappreciated. The Engelmanii, Douglassi, and Pungens sub-divide into various forms and colors.

The mountain cedars are varied, each variety having its own beauty and value. The spruce of the Black Hills sports into divers forms, well worthy of study. Peculiar species of the Trailing Juniper which take, in winter, the silvery glitter of snowy peaks, are destined yet to be the admired ornaments of city parks. And the incomparably lovely Silver Cedar and Blue Pungens will be so abundantly supplied that they may be used to grace the Iowa farmer's home.

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C. L. Watrous made his report as superintendent of the Iowa fruit display at the World's Fair:

HORTICULTURAL LESSONS OF THE COLUMBIAN EXPOSITION.

BY C. L. WATROUS, DES MOINES.

This subject was doubtless assigned me in view of official connection with the fair and in expectation of facts regarding the lessons of such a great undertaking, both from the exhibits themselves and from the means taken to secure and maintain them there.

In preparation for this event, this society, at its January meeting in 1892, elected a superintendent of the horticultural exhibit at the Columbian Exposition in 1893, as the record shows. The same record shows that the board of directors, on motion of Director B. F. Ferris, resolved that any question arising regarding the conduct of the representative of this society, be referred to the executive committee with power to act, and further, on motion of M. E. Hinkley, that the superintendent of fruit display of Iowa, at the World's Columbian Exposition, be authorized to expend, under the direction of the executive committee, not to exceed $500.00 during 1892. Furthermore, it was resolved that Silas Wilson be appointed as an alternate superintendent of fruit display at the World's Columbian Exposition. All the foregoing action having been taken in pursuance of invitations by the secretary of the Iowa Columbian Commission to assist in making the display, the superintendent was instructed to arrange with that commission, if possible, a plan whereby this society should have a suitable portion of the State appropriation set aside for its use in making the display. In pursuance of these instructions, your representative was allowed a hearing at a meeting of that commission held in Des Moines about June 1st, 1892, where he urged, with all the force he was master of, the necessity of prompt action by the commission in one of two ways, either by confirming the action of the Horticultural Society as relating to superintendent, and authorizing him to begin work then, or else by refusing such assistance and appointing for itself a superintendent, with authority to act at once.

As a result, the commission referred the subject to Commissioner Dent, with power to arrange with the Horticultural Society and to contribute out

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of the State appropriation not to exceed $2,000.00 towards such exhibit. Your representative immediately interviewed Mr. Dent, and was informed that he had already corresponded with Mr. Murphy, of Mills county, and had made such progress in the negotiation with him that he had determined to appoint him unless the arrangement with the Horticultural Society was consummated. Your representative urged the vital importance of prompt action in one of the two ways already mentioned, but was unable to conclude anything. Thereupon he prepared a contract covering the rights and duties of the commission and the society in a joint effort at an exhibit, providing therein that the commission should allow out of its funds $2,000.00 and no more; that it should allow the society the management of the exhibit in every particular and should extend all proper official aid. The society, on its part, agreed to place one of its experienced members in charge of the work, to hold the commission financially harmless, beyond the $2,000.00 before mentioned; that it would furnish of its own funds at least an equal amount and as much more as it was able and make the best showing it could with the means available.

This agreement having been ratified after a long delay, the commission paid over $600.00 of the appropriation to begin the work with. This money was not placed at the disposal of your representative until September 28th, 1892, long after the season of all small fruits, grapes, cherries, plums and pears had passed. Circulars had already been prepared and were sent to every known horticulturist in the State, asking their co-operation. At the State Fair, the first of September, personal appeals had been made, but had met with the universal complaint of a short crop of apples, especially of winter sorts, and what was much worse, and in fact fatal to success, was the complaint that what little fruit had matured was so inferior as not to be fairly representative, or to reflect credit upon the grower. There was a universal chorus of excuses and in many cases a flat refusal to contribute such fruit as had survived the scab, blight, insects and drouth, on the ground that it would discredit rather than honor the contributor.

These statements and refusals were more earnest and emphatic in the south and west of the State than in any other portion, in so much that there was a total refusal to contribute anything from all that region, in the fall of 1892, except that the president of this society contributed one small box of very inferior specimens of one variety, the Rall's Genet. Your representative could not change the decrees of God any more than the owners of the orchards could and was only able to store up such fruits as could be obtained from other, and usually less favored portions of the State. Director Wragg of Dallas county made a collection which was the best, as I believe, that could have been made; but there was no cold storage available. That which had been repeatedly promised at Chicago and relied upon failed utterly when needed, consequently, many varieties gathered with such care and expense decayed and were lost.

Directors Steinman and Patten did all that could be done in their regions and furnished the bulk of the spring exhibit. Mr. Edson Gaylord, Mr. E. R. Heisz and others furnished smaller quantities and also deserve thanks for their patriotism. About December 1st a new cold storage plant in Des Moines was ready and all fruit transferred there. Materials for packing and full directions had been sent out to proposed contributors. Each specimen

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was wrapped in two papers, a soft tissue paper first and over this, one treated with paraffine to exclude air. The result justified this work for our fruit came out of the boxes at the end of April in Chicago with brighter color and less decay of any sort than any other fruit I saw there. It also held up wonderfully under the exposure on the tables, such early and transient varieties as Plumb's Cider, Utter's Red and Fameuse remaining on the plates as long as four weeks or more in May and June. Many longer keeping sorts, Ben Davis, Melinda, Jonathan, Genet and Willow Twig remained sound though somewhat withered for some six to eight weeks.

The behavior of fruit from cold storage was a complete surprise to every pomologist there, and was a theme of more admiring discussion than any other lesson of the spring display. It was a revelation of some of the possibilities of properly conducted cold storage entirely unlooked for, overthrowing once and for all the former belief that fruits from cold storage are necessarily short lived after coming out. All the Iowa packages were opened May 1st and about half the contents placed on the tables, the balance still wrapped in the papers were replaced in cold storage on the fair grounds and came out June 6th not appreciably the worse for having been once removed from storage, held some days in warm air and then returned to the cold. Several varieties of the second lot lasted on the tables till new apples came again in August. This one lesson of the powers of properly managed cold storage is enough if properly utilized, to repay over and over again all the labor and expense of the spring display. There is in my judgment, no reason to doubt that many fruits besides apples may be successfully held by this means so that they may come upon our tables at seasons not heretofore thought of. Mr. Mathews, of this society, has already placed pears in storage to remain a year, if possible. The most striking object in the spring exhibit of Iowa, was a fine display of Willow Twig apples grown in 1891, in Mills county, Iowa, and held in cold storage in Chicago until the summer of 1893, where they were fine and fair the middle of August and later. One mistake was made by your representative in following a rule promulgated by the Department of Horticulture, to the effect that no duplicate plates of the same variety would be permitted on the tables. This rule was utterly ignored by everyone in practice. Could this have been foreseen, much difficulty might have been avoided; but the man who could look into the future as well as into the past, is dead and was buried in a nameless grave in the potter's field, among other unknown worthies. It would not have been possible with any foreknowledge to gather fine fruit in Iowa last year but more of it could have been gathered, such as it was.

One State placed on its tables three barrels of Ben Davis at the opening of the exhibition. Many square yards of it, four specimens on each plate, adjoining each other. Near these were two barrels of Genets arranged in the same educational way. The eight barrels of fruit on their tables consisted of five varieties, no more. Your representative had not prepared any such exhibit. We had thirty-six varieties, about two hundred plates in all. The only difficulty which your representative had with the authorities of the department, arose from an alleged rule which never appeared in print, to the effect that no exhibitor in pomology should have any seats or writing facilities in connection with his exhibit. No such rule obtained anywhere else on the grounds and was abandoned in pomology long before the end of

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the season. After some six weeks of painful attempt to obey this rule, if rule it was, and after consultation with one of our executive committee, I procured chairs and desk to enable me to do the necessary work of a superintendent. The desk and chairs were seized and carried away in the night time by the superintendent of pomology, a stout young man from Delaware, whose State had no horticultural exhibit. The chief of the department characterized the act as an outrage and ordered the property returned. The young man however had sufficient political backing to enable him to repeat the outrage and no effort was afterwards made to recover the desk, so that your representative labored under needless difficulties imposed by one who should instead have been his willing helper.

The folly of expecting men of mature age, chosen for their experience, to do their work for months at a time without an opportunity to rest or write, became so apparent and received such bitter criticism that the lesson is not likely to be lost upon any future exhibit of this kind. There was universal complaint from those in charge of horticultural exhibits, that the average State commissioner failed to appreciate the difficulty and expense of making creditable horticultural exhibits. In most States the commissioners refused the horticulturists such share of the State appropriation as would enable them to properly represent horticulture. Out of eight hundred thousand dollars ($800,000.00), the Illinois commissioners allowed the horticulturists only a beggarly five thousand dollars ($5,000.00). A special act of the legislature compelled them to surrender twenty thousand dollars ($20,000.00) more. In Wisconsin after the early exhibit of apples, the horticulturists were cut down to the pay of one man, with no allowance for collecting and forwarding summer fruit. So their summer exhibit was ruined and their representative met went home in despair. Michigan was in no better condition. Kentucky had the same difficulty. Even New York, which had the finest educational exhibit in horticulture, had something of the same experience, so that their chief of that exhibit was compelled to leave his work because of lack of support from his State commission. The States of Kansas, Nebraska, Indiana, and Ohio, had such meagre appropriations that they thought it unwise to attempt any spring exhibit. It might have been better had Iowa followed the same course; for, with only two thousand dollars ($2,000.00) from the commission and the same amount from the society, it was necessary to use the utmost economy in expenditure or else have insufficient money for the great exhibit in autumn.

No hint ever reached your representative that he was desired to attempt any other display than that of fresh fruits in their season. To have attempted to compete with other states having larger appropriations, in the spring exhibit, would have been fatal to our autumn display. New York and Illinois used more than two thousand dollars ($2,000.00) each in fixtures for the spring exhibit, Missouri at least as much and Minnesota a large amount. Iowa was shut out from all this by the very meagre appropriation. Different members of your executive committee, and especially the secretary of this society, had often advised me that the spring exhibit be made with rigid economy and most of the money be saved for a grand display in autumn, when Iowa can do her best. Your representative had been ordered to expend not more than five hundred dollars ($500.00) during the year 1892. When all bills had been paid it was found that the limit had nearly been reached.

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Upon looking back over the whole field I am not able to see that any very different course on the part of your representative would have been wise. As early as March, 1893, the Columbian Commission complained to your representative because he had prepared no display of canned fruit. To this, it was explained that no cannery of fruits could be found in the State to furnish such an exhibit. The commission also urged an exhibit of seeds and seemed much disappointed because none was made. Your representative did his best, but was unable to find any seed house willing to co-operate except in one instance, and that upon condition than five hundred dollars ($500.00) should be paid for the exhibit besides all expenses of fixtures and attendance at the fair. It was decided upon all hands that lack of funds would prevent a seed exhibit. The same reason acted to prevent any exhibition of vegetables. A floral exhibit was undertaken but failed because no florist in the State was willing to co-operate. If the appropriation made by the commission had been made available, and your representative authorized to act in the early summer of 1892, according to his earnest representations to the commission, it would have been easy for him to make a creditable exhibition of canned fruits and jellies, as well as an exhibit of large fruits in jars. But as no money was placed at his disposal until the end of September, these things were not possible. It is my present judgment that an appropriation of at least ten thousand dollars ($10.000.00), available in the early spring of 1892, would have been necessary to enable any man to do what the commission seemed to expect of your representative. Few of you know how erroneous were the statements sent over the State as to Iowa's exhibit in horticulture. Some of your most experienced members, after having examined the exhibit, expressed themselves as surprised that a much better exhibit existed there than newspaper reports had led them to expect.

In June two of your executive committee visited the exhibit, and were fully informed as to everything relating to the management of it. Neither made any criticism upon this, and one, at least, expressed himself as much relieved and gratified that these things were not so bad as they had been painted. The spring exhibit of apples received commendations from the judges for good condition and correct nomenclature, and was awarded a medal for excellence. At the opening of the small fruit season, earnest preparations were made for the best exhibit possible; but it was found that certain police regulations of the fair authorities caused the loss of so much time that perishable fruits were ruined before they could be placed upon the tables. Active protests against these prohibitory rules, in which your representative took an active part, finally caused their modification, whereupon he whole State was promptly covered with circulars from your representative, asking for contributions of all small fruits and giving minutely the very best known directions for gathering, packing, and shipping. As a result of this the Iowa exhibit of small fruits, in spite of our severe drouth, was said by good judges to be second to none, except that of Illinois, which State had more than five times our appropriation, and used it well. This exhibit received commendations from the judges, and was awarded a medal for excellence. What different course your representative could have wisely pursued in the line of his positive instructions he has never yet been able to see. Some have seemed to suppose that a fruit exhibit can be made, with

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proper care and skill, like a piano or a carriage, to order, when wanted, without regard to the course of nature. If the fruit crop in Iowa in 1892 had been as fine as that of 1891, any man knowing something of the subject could easily have gathered a fine exhibit for the spring of 1893. As it was, I venture to assert, without fear of contradiction from any experienced horticulturist of the State, that no man could have gathered a fine exhibit of apples in the fall of 1892, grown in the State of Iowa, though he had been willing to coin his blood into specimen apples. If your representative had expended a sufficient sum upon fixtures and glassware to make any creditable display beside any of the other like exhibits, he would have rendered impossible through lack of money, the fine autumn display which Iowa could furnish this year, which he had fully planned, but which he was not allowed to make.

Early in August the State commission, without proper investigation, passed resolutions attempting to repudiate their contract with this society, upon the ground that the exhibit thus far had been a failure. If they had been thoroughly informed of all the facts in the case it is not to be supposed for a moment that they would have taken any such action. They would have appreciated the fact that no man can eat his cake and still have it, that no one could have spent large sums upon the spring exhibit, and yet have saved sufficient to adequately represent Iowa when her fruits are in their autumnal glory. These reasonable considerations were urged upon members of the commission, whereupon they agreed to do their duty in assisting to make a fine display in the autumn. Nevertheless a section of the State urged that the president of your executive committee should visit Chicago in person and act as peacemaker. This he did after the above understanding had been reached by the representatives of this society and the commission. It was his judgment that the exhibit would be better under his own management than under that of your representative, who urged that up to this time he had been quite unable, under his instructions as to economy, to do more than to make the exhibit already accomplished, and that having exerted himself strenuously to make a creditable exhibit during all the months of scarcity, and having full plans made for a fine autumn exhibit, with promises of abundant contributions from correspondents in all parts of the State, common justice required that he be given a chance to carry out his work during the time of abundance then at hand. These reasonable considerations which seemed conclusive to your representative and to others on the ground fully acquainted with all the facts, failed to shake the determination of Mr. Collman to take charge of the exhibit in person. As he was chairman of our executive committee and had the support of our secretary in his views, there was no appeal possible and the exhibit was turned over to him in full on August 24, 1893. By this action a new complication was created by his admission of the right of the Columbian Commission to repudiate its contract with this society, which right your representative had strenuously denied, and still denies. Your representative would never admit that this right of this society under its contract was any less than that of another party to the same contract. The consequences of the surrender of the rights and dignity of this society have not yet been fully felt. In closing I wish to submit two letters voluntarily written to your representative by two officials of the Columbian Exposition, upon my leaving the exhibit.

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The first, by one of the judges, is dated,

CANADIAN PAVILION, JACKSON PARK,
CHICAGO, U. S. A., August 21, 1893.

This certifies that as one of the jurors in horticulture at the World's Fair, I examined the Iowa collection of fruit several times during the months of May and June. On the 3rd of June there were thirty-two varieties shown, and about two hundred plates displayed. Mr. Watrous was in attendance and kindly gave me all information desired. Just now the Iowa collection is good and creditable under his care.

(Signed,) L. WOLVERTON.

The second is from the chief of the Department of Horticulture, World's Columbian Exposition, dated,

DEPARTMENT OF HORTICULTURE, J. M. SAMUELS, CHIEF.
CHICAGO, ILLINOIS, U. S. A., August 24, 1893.

Mr. C. L. Watrous:

MY DEAR SIR.—It affords me great pleasure to assure you of my appreciation, as a friend and in an official way. During the time that you have represented your State at the Columbian Exposition our relations have been of the most cordial character, and I have ever found you attentive to the interests of your State and I believe you have made the best possible exhibit under the circumstances. As the fruits of the current year ripened, you were prompt to secure and place them upon the exhibition tables. Iowa's exhibit compares favorably with the best at the fair and is daily improving.

With high regard, I remain,

Yours very truly,

J. M. SAMUELS.

THE IMPROVEMENT OF OUR NATIVE FRUITS.

BY B. A. MATHEWS, KNOXVILLE.

This is a matter to which attention can be given to a greater or less extent by every fruit-grower in connection with his calling. And, were this effort made general, more speedy progress could be effected.

Nearly forty years since, the writer began making a collection of wild plums in this vicinity. Some of these are here yet. After a few years he drew upon more distant localities. This has been kept up until the collection now numbers nearly one hundred and fifty varieties, gathered from coast to coast, and from the Gulf to the British line.

We have doubtless, the best native plums in the world with which to experiment, and to start with such sorts as DeSoto, Wolf, Wyant and Cheney, who can limit the possibilities?

If the peach has been developed from a worthless, or possibly a poisonous, almond, and the apple from the acerb wild apple of Europe, what may not be derived from the beautiful and luscious fruits above named?

The best of our wild crab apples have also been secured and cultivated for many years. Specimens of some of these have been seen by many members of your honorable society. Besides this your organization has used one variety of these crabs to cross with many of our best common apples. The writer, too, has raised and is growing some trees like these. What the outcome will be, the future must determine.

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A thousand or more trees of native seedling mulberries have been grown and tested. From among these, a few very desirable ones have been secured.

Again, a few good persimmons have been obtained. One is entirely seedless, has borne heavily and been satisfactorily hardy in this, Marion county, since 1848. Another, a seedling raised by the writer hereof, from seeds received from north Missouri, is much larger, earlier and better in quality. The value of several other promising seedlings will soon be determined.

About seventy-five large Juneberry trees, native to this locality, planted more than twenty years ago, furnish some interesting object lessons as to size, quality and fruitfulness. The best of the dwarf Juneberries have been drawn from all quarters, but thus far the natives mentioned have furnished much the best fruit for the table, besides, one of these is larger than the average of the dwarfs.

A very prolific blackhaw of remarkably large proportions has received attention for many years.

Also trees yielding prodigious specimens of Red Haw and Buckeye have not been overlooked.

During the past few summers the thickets hereabout have been searched diligently for the best native gooseberries. Quite a plantation of these has been made. Some of them are very prolific bearers of fruit decidedly larger than Houghton. These bushes were planted with a view to crossing with our finest domestic varieties. But this course is not contemplated at present, as the opinion of the planter now is that our native or wild gooseberry is the very best fruit of its kind in existence, for stewing or canning. The object is to improve this berry without the admixture of foreign blood.

The general aim, then, in all this is, to get together into plantations or orchards the best varieties of all the most valuable kinds of our native fruits. These might be called pointers. With the orchards or plantations of pointers secured, the experimenter would be ready to produce seeds either by natural or artificial pollenization. These seeds to be grown under the most thorough and complete cultivation, as under such conditions they are expected to be more likely to "sport." Then the seeds of these sports can be used under culture as above outlined; when, it is believed, a most interesting and exciting stage of this work would be reached.

DISCUSSION.

PROF. L. H. PAMMEL: It is interesting to note that susceptibility to disease may be transmitted in breeding fruits. The plum scab is not found on the European plum (*Prunus domestica*), but is abundant on our native *Prunus Americana*. A hybrid between these two species growing on the college grounds, is affected by this fungus.

R. P. SPEER: No fruit that I know of is so easily affected by the stock on which it is budded or grafted, as the plum. Messrs. Welling and Philpott, about twenty-one years ago, began to propagate a choice native plum found on the Cedar river. Pits of the

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small late inferior frost plums were secured in the woods near by, and when two years old were top-grafted with the choice variety. Three years afterward they came into bearing, but all were as small and inferior as the frost plums used for stocks. We must be careful in the selection of proper stocks for the plum, owing to this remarkable influence of stock on graft.

C. G. PATTEN: I agree with Prof. Pammel in the belief that trees transmit their susceptibility to disease. I had a Roman Stem top-grafted on a Yellow Siberian crab, and grew about a dozen trees from the Roman Stem seed. They were very thrifty at first, but when four years old they began to blight, and were soon all dead. The seeds had been contaminated in the very germ by the blighting tendency of the crab. In our work in cross-fertilization, we should select the most perfect trees, growing under the best conditions.

ELMER REEVES: My experience has been that plums are easily affected by the stock, and also by the season and soil. Plums vary greatly in wet and dry seasons. I attribute to this the variability of plum pits. Still there is a tendency for the best varieties to reproduce themselves, so in growing seedlings for grafting and budding I select the pits from fruit used for canning. I think this is much better than gathering pits indiscriminately from inferior trees in the woods. I advertise for them in the county paper. Root-grafting the plum is better than top-grafting, as there is less influence of the stock on the graft.

N. T. CASE: The peach has been found to be a good stock for the Chickasaw varietes of plums.

DEFINITE ANNUAL GROWTH AND ITS RELATION TO HARDINESS.

BY PROF. L. H. PAMMEL, AMES.

The subject of hardiness in trees is one that is engaging our attention, and to horticulturists in Iowa is of paramount importance. If the microscopist or the chemist could but say by making an examination of the structure of a plant, or a chemical analysis, that the plant is hardy or tender, much in the way of experimental work would not be necessary. That subtle factor, life, manifests itself in so many different ways in living organisms that vegetable physiologists have as yet not been able to establish any

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definite laws along the lines of hardiness and tenderness. The underlying laws of plant growth, nutrition, assimilation and respiration are well established and recognized by vegetable physiologists. No doubt some of these factors are intimately associated with hardiness and tenderness. It stands to reason that a plant having its vital functions more active is able to stand untoward influences better than a plant not so endowed.

In dealing with the question we must consider the agents which in any way influence or impair the proper functions of a plant. These injurious influences are extremes of temperature, either high or low, too intense light, improper food, poisons and mechanical agents. Plants vary greatly as to the amount of heat they can stand. Goodale,[1] who quotes from DeVries, states that the limit of heat corn can stand when the roots are in the soil is 50° C. or 122.18° F., when in water only 45.5° C. or 113.9° F., roots in soil 50° C. or 122° F. Dr. Goodale[2] says of "winter killing:" "The destruction of many plants by exposure to the many influences of a variable winter is sometimes attributed to the injurious effects of drying winds rather than to cold alone."

When light is too intense on the plant injurious effects are noticed as Pringsheim has shown. It is a fact of common observation that many plants only thrive when grown in shaded places. Many of our ferns fail in open places because they are habituated to their shady nooks. I shall not here discuss the other untoward influences since they have no bearing on our subject.

The theories in regard to hardiness have been numerous. One prom i inently advocated is that the number of palisade layers indicate hardiness. I take it that the advocates of this theory have generalized too much without the actual facts of investigation at hand. I may here be permitted to quote from what my friend, Prof. Bessey[3] has said on this point.

"The introduction of the great numbers of varieties of apples and pears from Russia and eastern Asia, made by Prof. Budd, have made it possible to make microscopical examination of the leaves, These have not as yet been sufficiently numerous to permit of a full report being made, but this much can already be said, that there appear to be marked differences in details of microscopical structure between the leaves of the hardier and those of the tenderer varieties. The epidermis of the hardy varieties appears to be thicker, and in a cross-section of the leaf the 'palisade cells' are more numerous." It will be seen from this that Dr. Bessey makes no mention of the number of rows of "palisade cells." I have never believed that this fact alone could establish hardiness. The number of "palisade" layers, no doubt, has an important physiological bearing. If the theory is correct that the chlorophyll acts as a screen, and thus tempers the light which is so essential for assimilation, the "palisade cells" are of great importance. Light and shade, therefore, greatly influence the "palisade cells" of a leaf. To make sure that my position in this matter was correct, I have examined leaves of tender and hardy varieties and found that no uniform rule could be established. I have also had students in the laboratory investigate this question. All have vindicated my position. But, the assistant, Mr. F. C.

[1] Physiological Botany, p. 471.

[2] l c p 472,

[3] Eighth biennial report, Iowa State Agricultural College, 1878, 1879, p. 101.

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Stewart, made an extended investigation in the botanical laboratory on this subject last year. He has shown that the number of "palisade cells" does not indicate hardiness. You will find his report in a paper read before the Eastern Iowa Horticultural Society for 1892 (p. 466).

There are no structural differences in regard to "palisade cells," and so far as hardiness is concerned, this question does not enter into this discussion.

A second question often considered in relation to hardiness is the reserve food stored away by the plant and the condition in which it is found. Director R. P. Speer,[4] puts it in this way, "But how is it with an unripe tree?"

It has no granulated starch stored up at any point, the cells of its pith and medullary rays are empty; the pores of its sieve tubes are open, and the albuminoids which they contain are so diluted with water that they are comparatively worthless; the lenticels are open, and at all points where leaves are attached to its branches there are unhealed wounds through which much water will be lost during the winter.

Aside from the papers published by Mr. Vincent[5] in the reports of the Horticultural Society, two papers have been published by Dr. Halsted[6]. His work was done at the Iowa Experiment Station on the solicitation of R. P. Speer, who was director at that time. Dr. Halsted's investigation of the microscopical structure of apple twigs was a most laudable one, as nothing very extensive on the reserve food material of our American fruit trees had been done before. Prof. Patrick[7] also made a chemical study. Any information bearing on this subject is always of great interest, since it will set at rest any vague notions concerning the distribution of these substances in plants.

Two terms are used in descriptive botany to designate whether a tree or shrub makes a definite bud at the end of the spring growth, or whether it continues to grow all summer till stopped by frost. In the first case it is called *definite annual growth*. The shoots in the spring start from well-formed strong buds. These buds contain all the parts and make their growth in a short time; when this growth is made the buds begin to form for next year's growth. The second kind is called *indefinite annual growth*. The shoots of the raspberry and grape continue to grow till nipped by frost. These stems form no true terminal bud, but the end of the shoot or stem is killed by frost. In these, the wood in the end branches is not ripened and consequently is easily killed. Our apples, so far as I have examined them, all have developed a terminal bud; in a few of the more tender varieties the stems were more or less flexible and the bud not mature. Such trees, of course, will be killed back.

The matter of resistance of plants to frost, especially in plants that make an indefinite annual growth, is one of great interest. I have, for several

[4] Iowa Hort. Rep., p. 160.

[5] Starch in the cells of fruit trees, Iowa Hort. Rep., 1884, pp. 73-74. Blossoms of fruit trees, Iowa Hort. Rep., 1884, pp. 217-218. Tests of hardiness of fruit trees, Iowa Hort. Rep., 1885, pp. 103-106.

[6] Bull. No. 4, Iowa Agricultural Experiment Station, pp. 104-132. American Pomological Society, 1889, p. 45. Reserve food materials in buds and surrounding parts. Memoirs of the Torrey Bot. Club, vol 2, No. 1, p. 26, with two plates.

[7] Bull. No. 4, Iowa Agri. Experiment Station, pp. 99-103.

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years, made some observations along this line, and one of my reports will be found in the Proceedings of the Iowa Academy of Sciences for 1892. In that paper I noted the great resistance of such plants as *Phlox drummondii*, certain pinks and castor oil bean.

I have been particularly interested to observe the behavior of the leaves of certain plants like the half hardy peaches, which, farther south, make a definite annual growth, but with us frequently indefinite. The leaves of this plant can stand a great amount of frost in the fall before being killed. Again certain half hardy catalpas like *C. Kaempheri*, the leaves of which can stand more frost than some of the more hardy plants. I may also note here that the condition of the soil and humidity of the atmosphere greatly influence the frost limit of plants. The greater the amount of water in plants the easier will they be affected by frost. Why could not some observation along these lines be made to cover a period of years?

In studying the hardiness of trees these important topics must be taken into consideration.

STRUCTURE OF BRANCHES.

That we may better understand this question a few words on the anatomy of wood should here be given.

A cross-section of one year old twig consists of the pith, and radiating out from it, the medullary rays which consist of fine plate like cells, between the medullary rays occur the woody elements which consist of large vessels and thick-walled long cells, outside of the woody elements, occurs the cambium layer from which the new wood is formed on the inside. The cambium layer is followed by a layer of bast consisting of long thick-walled fusiform cells, next to this a number of irregular cells containing chlorophyl, with large, intercellular spaces. In this layer also occur cells that contain crystals of calcium oxalate. The outermost portion consists of several layers of cells some of which are tinged with a red coloring matter. The characteristic brown or red color of young twigs is due to the colored sap contained in this layer; while the tissue was green and soft it consisted of the epidermis, this as the branch becomes older is replaced by tabular cells, the cork. This cork is impervious to water and protects the plant from cold and other injurious influences.

BUDS.

The character of the bud is very important to the plant. They have various protective coverings, varnished as in the Horse Chestnut, hairs in the apple. In the apple tree we have terminal and lateral buds. The terminal bud is usually vigorous and externally in most varieties, they are covered by a soft felt; this felt is frequently found on the branches and protects the plant from the cold of winter. It is interesting here to note that frequently next to the small green scales there occurs a cushion of hairs which gives additional protection. Buds so far as their function is concerned are of two kinds, flower and leaf buds. Buds are simply undeveloped branches and the little scales on them correspond to leaves, the outer scales are dry but those in the center are green and contain albuminoid substances. These green scales in spring unfold and form the first leaves. The incipient shoots are enabled to make so much growth in a short time because of the material that is stored away in the pith and medullary rays.

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RESERVE FOOD SUBSTANCES.

We may now consider the reserve substances. The reserve food material of plants is stored away in various forms, the most important are carbhydrates (starch, sugar, oil, occasionally cellulose) and albuminoids. The reservoirs for storing this material differs in different plants. It may be found abundantly in the cotytedons of the seed, or albumen, (endosperm and perisperm) pith, medullary rays, roots, root stalk, tubers, etc.

Starch consists of carbon, oxygen and hydrogen in somewhat different proportions than sugar. It has the same chemical composition as cellulose. It is best illustrated by such a simple case as the starch in potato. Cellulose is commonly found in young cell-walls as in the cells of the "palisade-cells."

Cotton fibre is pure cellulose. Older woody fibres of trees originally had cellulose, but this has become impregnated with lignin. Starch and cellulose may be detected quite easily by applying iodine for starch and iodine and sulphuric acid for cellulose, or better a preparation known as chlor-iodide of zinc. Starch colors blue with iodine, whereas cellulose will not give a blue reaction with this reagent, but it colors a violet blue with sulphuric acid and iodine.

COMPARISON OF VARIETIES.

Before proceeding to describe the different varieties, it may be well to state how I proceeded in this work. An examination was made of the general character, appearance of the buds and twigs. The terminal bud was cut longitidinally through the centre so as to cut into the soft cellular portion which I designate as unlignified pith. The bud scales are situated on this portion. This section also brings in view the parts below.

I made longitudinal sections three inches and usually nine inches below. I also made a longitudinal section through the lower part of this and last year's growth, especially the part which was unlignified at the end of the 1892 growth. I also cut a longitudinal section for some distance below last year's growth.

From all these parts very thin longitudinal sections were cut A transverse section about half way down this year's growth was made. Iodine was applied to all of these parts and the effects noted. These sections were placed under the microscope and customary reagents applied. Millon's reagent for albuminoids and character of the starch noted. Hydrochloric and acetic acid was used to test for mineral substances.

The specimens from the college grounds were collected on October 25th, by Prof. N. E. Hansen, those from Mr. Wragg, of Waukee, were received about one week later and were taken from the nursery and orchard.

Rawle's Genet, College.—Leaves still green, twig bright, and vigorous, terminal and lateral buds were well formed. This tree stands in a grassy lawn protected by pine trees on the west and partially to the north. Pith and medullary rays well filled with starch, solid and granulated. It was also found in some of the scales but less in quantity than in the nascent stem. Pith of 1892 below this year's growth brown, contains less starch at the junction of this year's growth. Abundance of crystals of calcium oxalate in unlignified pith at the end of branch, but an abundance of albuminoids; starch also found in the green parenchyma cells outside of bark. It should be noted that leaves were still green and this accounts for the starch in the unlignified pith and green scales.

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Rawle's Genet, Wragg.—Buds well formed; leaves persistent; pith solid and well filled with starch; in unlignified cone no starch, but an abundance of stellate crystals of calcic oxalate and albuminoids; at junction of 1892 and 1893 growth pith area large, with an abundance of starch.

Oldenburg, College.—Some leaves still clinging to the branches, especially near the top. Terminal buds well formed. Pith solid, granular, and contains an abundance of starch; lignified pith contains an abundance of stellate crystals of calcium oxalate. It also contains deposits of albuminoids. Pith of 1892 contains some starch, but less than in this year's growth.

White Winter Pearmain.—Buds formed, but stem is somewhat shrivelled, and below the bud is flexible. Pith, below unlignified portion, whitish, not solid; contains less starch than it does eight inches below where the pith has that luster peculiar to a healthy tree. Unlignified pith contains no starch, but an abundance of crystals of calcium oxalate. Albuminoids also abundant. The unlignified pith has several longitudinal fissures. Pith of 1892, brown, but at junction of 1892 and 1893, pith is large and well devoloped, with an abundance of starch.

Paradise Winter Sweet.—Stems and buds covered with hairs. In one branch, pith of 1893, near the upper part, brown, in others it was pale whitish. Many of the cells were empty, containing no starch. Pith zone narrow, except at junction of 1892 and 1893 growth, where it was twice as large as in other places. Medullary rays contain an abundance of starch; unlignified pith no starch, but an abundance of albuminoids and stellate calcic oxalate crystals The unlignified pith of 1892 is strongly lignified, but contains no crystals.

Hubbardston Nonsuch.—Branches look sound; terminal and lateral buds well formed; one branch, upper part of stem, near bud, flexible. Unlignified pith contains an abundance of crystals of calcic oxalate and albuminoids. At the junction of 1892 and 1893 growth of pith, lignified and wide, with an abundance of starch, occasionally a stellate crystal. Medullary rays contain an abundance of starch; pith also.

Sheriff.—Most of the twigs mature; a few are faulty, having a flexible stem near top. Pith just below terminal bud well filled with granular starch of the right color and that "grittiness" so marked in well matured twigs; three inches below it is whitish; many of these cells contain but little starch. At junction of 1892 and 1893 growth, pith solid and wide. Last year's pith, brown; some cells empty, contain less starch than 1893 pith. Medullary rays all contain an abundance of starch; albuminoids and calcic oxalate abundant in unlignified pith.

Bailey's Sweet.—Twigs do not look well, although terminal buds are formed; upper part of stems flexible longitudinal fissures, in unlignified pith; the latter is white and not solid. Unlignified pith contains an abundance of stellate crystals of calcic oxalate, also albuminoids. Starch not abundant in this white pith, but at base of this year's growth, pith large, granular and well filled with starch, also abundant at junction. This junction contains no crystals.

Autumn Strawberry.—In this variety there appears to be some variation; in some cases the buds appeared mature, in others, upper part of stem is flexible, pith is whitish and does not contain as much granular starch as it should have. Microscopic tests show that many pith cells are empty. The

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unlignified cone contains an abundance of crystals of calcic oxalate and a deposit of albuminoids. The pith of 1892 is brown and contains less starch than that of 1893. Medullary ray-cells filled with starch.

Utter's Red.—Branches short, buds apparently well formed. Upper part of this year's pith solid and an abundant granular starch. Pith of 1892 brown, and just below cone slightly chambered, dead; no starch in lignified pith cells, but starch abounds in medullary rays. Unlignified pith contains abundant stellate crystals of calcic oxalate, also albuminoids.

Rome Beauty.—Twigs in excellent condition, bright and good looking, terminal buds well formed, pith solid for the whole length of 1893 growth, and well filled with starch, as are the cells of medullary rays. Pith of 1892 just below junction, brown, contains many empty cells with comparatively little starch. The pith at junction of '92 and '93 branch, large, contains an abundance of starch, but no crystals.

Jonathan.—Some of the terminal buds were injured; several were found which were in good condition; lateral buds were well developed; scales covered with hairs; some starch contained in the unlignified pith; six to to nine inches below terminal bud, pith solid and granular, well filled with starch; unlignified pith contains an abundance of stellate crystals of calcic oxalate.

Warfield.—Branches short, and near the end somewhat flexible, but bud looks well; '92 pith, brownish, contains some starch, but many cells are empty; pith of '93 good and solid, much granular starch. The unlignified pith contains an abundance of stellate crystals of calcic oxalate; medullary rays abound in starch.

Red June.—Some twigs evidently injured; hardly mature leaves persistent; upper portion of stem flexible; unlignified pith with several longitudinal fissures; pith partially white, and not well filled. Pith of 1892 brown, with many empty cells; unlignified pith has an abundance of crystals of calcic oxalate, also albuminoids; pith large at junction of 1892 and 1893 growth, well filled with starch and of the right consistency.

Roman Stem.—Terminal and lateral buds well formed; branches quite smooth; pith gritty, well filled, greenish-white in color; unlignified cone has an abundance of crystals of calcic oxalate; albuminoids also present. Pith at junction of 1892 and 1893 growth large and well filled with starch, contains no crystals. Medullary rays of 1892 and 1893 filled with starch. Green bud scales also contain albuminoids.

Townsend.—Stem evidently not mature in all cases, as the terminal bud is not well formed; leaves very persistent; upper part of stem near cone flexible; pith four inches from bud, white and not solid, with many empty cells, but that portion, bordering on the wood is well filled with starch. Unlignified cone contains an abundance of stellate crystals of calcic oxalate and albuminoids.

Fulton.—Evidently not mature; some branches look better than others; near the top they were soft and flexible and not of the normal color. Unlignified pith contains longitudinal fissures and an abundance of calcic oxalate crystals and albuminoids. Pith of 1892 brown; some empty cells, but still gives a decided blue reaction with iodine. Junction of 1892 and 1893 growth large, and well developed pith; wide area.

Cole's Quince.—Well formed lateral and terminal buds, scales covered with hairs, pith solid below cone, and well filled with starch; 1892 pith

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brown, some starch, and empty cells. Unlignified pith has an abundance of crystals of calcic oxalate and albuminoids.

Tallman Sweet, College.—Leaves persistent, terminal and lateral buds well formed, scales and ends of twigs hairy, the hairiness on stems even extend down to last year's growth, pith solid and gritty well filled with starch, pith area at junction of 1892 and 1893 growth, large and well filled with starch; 1892 pith brown with many empty cells. Medullary rays well filled with starch. Unlignified cone contains an abundance of crystals of calcic oxalate and albuminoids.

American Summer Pearmain.—Terminal and lateral buds well formed, pith well filled with starch, also medullary rays. Unlignified pith contains an abundance of crystals of calcic oxalate and albuminoids.

Wealthy.—Buds well formed, in some cases somewhat flexible; wood apparently well formed; 1892 pith, brownish with many empty cells, six inches below whitish, not filled with starch. Medullary ray-cells well filled with starch. Unlignified cone contains an abundance of crystals of calcic oxalate and albuminoids. At junction of 1892 and 1893 growth pith area wide, solid and well filled with starch

Willow Twig.—Terminal and lateral buds well formed, covered with hairs; pith contains an abundance of granular starch; pith of 1892 brown. I state in my notes, " Pith of last year perhaps not well formed." Unlignified pith, abundance of crystals of calcic oxalate.

Westfield.—Terminal and lateral buds well formed; stem stiff; buds hairy; the terminal bud much enlarged; unlignified cone contains an abundance of stellate crystals of calcic oxalate and albuminoids; pith, relatively large, contains an abundance of starch near the upper part, but six inches below the pith is not so solid; white in appearance; pith at junction of 1892 and 1893 growth large; the wood area small, solid; medullary rays of 1892 and 1893 contains an abundance of starch.

Snow or Fameuse.—Twigs bright, clean, with a healthy look, but somewhat flexible below bud; pith solid and granular in appearance; at junction of 1892 and 1893 the pith area is large; there is an abundance of starch at this point, but no crystals; the unlignified pith has an abundance of albuminoids and stellate crystals of calcic oxalate; medullary ray-cells contain an abundance of starch.

Rhode Island Greening.—Buds well formed, covered with hairs, and where they fold over each other a small cushion of hairs occurs; starch abundant, and 1893 pith solid; 1892 pith brown, with some starch; unlignified pith contains an abundance of albuminoids and stellate crystals of calcic oxalate; some starch also occurs, but this is mostly at the lower end; medullary rays contain an abundance of starch.

Antonovka.—Buds well formed, but not conspicuous, medullary ray-cells filled with starch; pith-zone narrow, granular, and well filled with starch. Starch also occurs in region below bark; unlignified pith contains an abundance of stellate crystals of calcic oxalate and albuminoids. In my notes I state: " I cannot see how the structure of this variety differs from Rhode Island Greening."

Chenango Strawberry.—Terminal and lateral buds well formed, covered with hairs; pith solid and well filled with starch; at junction of 1892 and 1893 growth, pith area large and well filled with starch; 1892 pith brown with

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empty cells; unlignified cone has an abundance of stellate crystals of calcic oxalate and albuminoids.

Winesap.—Some of the twigs are injured, blackened at the tips, buds covered with hairs. In my notes I state, "evidently not mature, indefinite annual growth." The best branch of the lot shows the tip to be flexible, unlignified pith with longitudinal fissures for half an inch. Below this point the pith is white and not solid, contains relatively little starch; eight inches below better, but some flaws; unlignified cone has an abundance of stellate crystals of calcic oxalate and albuminoids.

Benoni.—Terminal and lateral buds in good condition, covered with hairs; pith, solid, with an abundance of starch; also in medullary rays. Unlignified cone, an abundance of stellate crystals of calcic oxalate. An abundance of starch in medullary rays.

Lowell.—Good terminal, hairy buds; pith, with an abundance of starch, solid and granular in appearance. Pith at junction of 1892 and 1893 growth, large, with an abundance of starch; 1892 pith, brown, with many empty cells. Medullary ray-cells of 1892 and 1893 growth, with an abundance of starch. Unlignified cone contains an abundance of stellate crystals of calcic oxalate; also some simple crystals: albuminoids also occur.

Domine.—Leaves persistent; upper part of stem, near bud, somewhat flexible; buds, downy; pith solid below unlignified cone, but three inches below it is not solid—contains an abundance of starch. An abundance of starch in medullary ray-cells of 1892 and 1893 growth; 1892 pith, below junction, brown, with many empty cells. At junction, the pith area is wide, with an abundance of starch; unlignified pith contains an abundance of stellate crystals of calcium oxalate; also albuminoids.

Early Pennock.—Some of the twigs flexible near tip, hardly mature, buds downy, pith one inch below unlignified; the remainder solid and granulated with an abundance of starch. Twelve inches below central part of pith white; some cells empty; at junction of 1892 and 1893 growth, pith area wide and well filled with granular starch. Medullary ray cells of 1892 and 1893 contain an abundance of starch. Brown pith of 1892 contains many empty cells; unlignified pith contains an abundance of crystals of calcic oxalate and albuminoids.

Yellow Transparent.—Most of the terminal buds well formed and mature; stem below bud somewhat flexible, and in a few cases wood not well lignified. Unlignified pith contains an abundance of stellate crystals of calcic oxalate and albuminoids. Six inches below in central part of pith, white and not solid; at junction of 1892 and 1893 growth, solid and contains an abundance of starch; 1892 pith, brown with many empty cells; three inches below the bud, white, with comparatively little starch. Medullary rays of 1892 and 1893 contain an abundance of starch.

Northern Spy.—Buds well formed; not as hairy as in some varieties; unlignified cone has several longitudinal fissures and contains an abundance of stellate crystals of calcic oxalate, also albuminoids. Pith just below unlignified cone, white, not solid; at the junction of 1892 and 1893 growth, solid and granular, with an abundance of starch; 1892 pith, brown with many empty cells.

Early Red Margaret.—Terminal buds formed, covered with hairs; in some cases it is injured, evidently not mature; unlignified cone has an abundance of stellate crystals of calcic oxalate, also albuminoids; pith and medullary rays an abundance of starch; 1892 pith, brown, with many empty cells.

FIGURE 1. Twigs of Jonathan, to the left, cut longitudi...

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FIGURE 1. Twigs of Jonathan, to the left, cut longitudinally. The cross lines represent the pith; the dotted portion the unlignified pith. *1A* Cross section of one year old twig, natural size.

FIG. 2. Oldenburg. *a* Junction of 1892 and 1893 growth, showing wide pith area. *b*. 1893 pith area, longitudinal view. Natural size.

FIG 3. Cross section of a one year old twig—Oldenburg. *a-b* Pith. *a* Central part of stem, with large pith cells. *b* Smaller pith cells, with more starch grains than in *a*. *C* Wood. *c'* Medullary rays. *c''* Ducts. *d* Cambium layer. *e* Secondary cortex (phlœm) consisting of hard bast fibres *e'* of sieve-tubes and green parenchyma cells; these are traversed by the medullary rays. *f* Cortex consisting of thick walled cells (collenchyma) and epidermal cells *g*. The cork has not formed; but arises from the cork cambium. Highly magnified.

FIG. 4. Pith cells from Fig. 3 filled with starch grains; these cells connect with adjoining ones through fine pores; one empty cell shows surface view of pores. More magnified than figure 3.

FIG. 5. Jonathan. Cells contain less starch; size of starch grains varies in different cells. Highly magnified.

FIG. 6. Oldenburg. Unlignified pith cells contain albuminoids. In two cells are seen large stellate crystals of oxalate of lime. Highly magnified.

FIG. 7. Radial longitudinal view of Jonathan apple twig. Highly magnified, less than figures 4, 5 and 6. *a* Medullary rays with starch grains. *b* Pitted ducts. *c* Wood cells.

FIG. 8. Jonathan pith cells, some empty. *b* Cell containing a crystal of oxalate of lime. *a* Cells with large starch grains, brown. *b* Small starch grains. Magnified same as figure 7.

FIG. 9. Radial longitudinal section of Jonathan, near pith. *a* Spiral duct. *b* Pitted duct. *c*, Pith cells containing starch. Magnified same as figure 7.

FIG. 10. Longitudinal section of a seedling apple root. *a* Pitted duct. *b* Cells with starch grains, numerous pores extending from one cell to an adjoining one. Magnified same as figure 4.

All figures original, retraced in ink by G. W. Carver, except figures 1 and 2, which were drawn by Mr. G. W. Carver.

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VARIETY.	CHARACTER OF BUDS.	PITH OF 1892.	PITH OF 1893.	MEDULLARY RAYS, 1892 AND 1893.	UNLIGNIFIED PITH.	JUNCTION OF 1892 AND 1893 WOOD.	REMARKS.
Early Joe...	Well formed, hairy.	Brown. Nearly empty cells.	Brown just below lignified pith; good six inches below; abundance of starch.	Abundance of starch.	Calcic oxalate and albuminoids abundant. No starch.	Well filled with starch, solid and granular.	The brown and pale pith of 1893 contains many empty cells.
Arabian (college).	External appearance good. Scales hairy.	Brown. Many cells empty.	Well filled, solid and granular starch.	Well filled with starch.	Calcic oxalate and an abundance of albuminoids. No starch.		
St. Lawrence.....	External appearance good. Scales hairy.	Abundant starch in some cells. Others of the lignified pith cells empty.	Well filled, solid and granular starch.	Well filled with starch.	Some starch. Calcic oxalate and albuminoids abundant.		
Longfield (college)	Branches hairy. buds mature.	Abundance of starch.	Well filled, granular starch.	Well filled with starch.	No starch in cone, but an abundance of crystals of calcic oxalate, also albuminoids.		
Wagner.	Terminal and lateral buds sound and healthy.	Well filled with starch.	Abundance of starch. Solid, granular pith.	Well filled with starch.	A little starch in lower part of cone, but an abundance of calcic oxalate crystals and albuminoids.	Well filled with solid, granular starch; pith area wide.	
75 M (college)	Buds well matured. Hairy.		Abundance of starch. Granular and solid pith.	Well filled with starch.	Abundance of calcic oxalate crystals and albuminoids.		
Red Astrachan....	Terminal buds well formed. Scales hairy.	Brown. Many empty cells.	Well filled, solid and granular.	Well filled with starch.	Abundance of crystals of calcic oxalate and albuminoids.		
Gros Pomier. ...	Well formed, hairy buds. Branches sound.	Brown. Many cells empty.	Starch abundant, granular and well formed.	Well filled with starch.	Calcic oxalate crystals abundant. No starch.		
Sops of Wine. ...	Buds well formed, hairy. Branches look well.	Brown, but contains some starch with empty cells.	Well filled, granular. Abundance of starch.	Well filled with starch.	Calcic oxalate crystals abundant.		
Pound Sweet	Buds well developed.		Well filled with starch.	Abundance of starch.	Simple and compound oxalate crystals abundant, also albuminoids.		

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DISCUSSION.

THE SECRETARY: The scions sent by Mr. Wragg were all cut from trees standing in sod. This would cause earlier ripening, especially in a dry season. Dr. Halsted found the wood of trees growing in sod well ripened, while that from trees in cultivated ground was less mature.

J. C. FERRIS: I have native plums crown-grafted on the Sand cherry, and they have made a remarkable growth. They are not dwarfed in growth the first three or four years. The Sand cherry root is much enlarged beyond its usual proportions.

J. G. BERRYHILL: In the paper I notice that scions of tender varieties, such as Rhode Island Greening, were found to be well stored with starch. Is not a deposit of starch essential to hardiness?

PROF. PAMMEL: It is one of the requisites. One season's test is not conclusive.

J. G. BERRYHILL: As it is variable with different years, the investigation should be continued.

R. P. SPEER: When I was director of the Iowa Experiment Station, Dr. Halsted was employed to investigate this question. We became well convinced that the proper storing of reserve materials in the wood structure has something to do with the hardiness of varieties of the apple.

The following were appointed a committee on legislation: J. G. Berryhill, C. L. Watrous, Silas Wilson.

EVENING SESSION—SECOND DAY.

Session opened at 7:30.

The election of officers for the ensuing year was now held and resulted as follows:

PRESIDENT.

A. F. COLLMAN.....Corning

VICE-PRESIDENT.

J. C. FERRIS.....Hampton

SECRETARY.

J. L. BUDD.....Ames

TREASURER.

SILAS WILSON.....Atlantic

LIBRARIAN AND CUSTODIAN.

ED. WRIGHT.....Des Moines

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DIRECTORS.

BEN MCCOY, Second District..... Oskaloosa
W. H. HOLMES, Fourth District..... .....Davenport
M. J. WRAGG, Sixth District.....Waukee
R. P. SPEER, Eighth District..... ....Cedar Falls
M. E. HINKLEY, Tenth District.....Marcus
J. M. ELDER, Twelfth District..... .....Concord

J. S. Harris, delegate from Minnesota, and M. A. Thayer, delegate from Wisconsin, cordially invited the society to send delegates to their respective State societies.

Dr. J. W. Smith offered the following resolution:

Resolved, That while public parks are provided for by the Code of Iowa to a considerable extent, this society urges upon all incorporated towns and cities that have not already done so, to take early action to provide suitable parks.

2. That to advance the public park interest, we request the General Assembly to so modify and add to the present provisions of the Code as will render them more efficient.

DISCUSSION.

DR. SMITH: We all realize how fast the price of land is advancing, and it is high time to make suitable provision for parks. We have all been in large cities and know the great benefits of public parks, especially to the women and children. Fresh air is free but hard to get in our large cities. Proper action on the part of this society would influence legislation and mould public opinion. Fresh air at the proper season is far better than apothecary shops. Parks add to the culture of a people. Trees and flowers have a humanizing influence, and promote health, culture and happiness. Let all have an opportunity to breathe God's free air and sunshine. Properly managed, parks would not add appreciably to the taxes.

ELMER REEVES: We already have a law on parks, and I would like to hear it read.

THE SECRETARY: It would be best for a committee to examine the existing law on parks, and report to-morrow.

On motion, the resolution was referred to a special committee on parks. J. C. Ferris, J. M. Elder and Elmer Reeves were appointed as such committee.

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THE FOOD-VALUE OF FRUITS.

BY J. F. KENNEDY, M. D., SECRETARY STATE BOARD OF HEALTH.

In consenting to write upon fruit from a sanitary standpoint, I had no idea of the small amount of literature I would be able to find upon the subject. While this fact has been an inconvenience and a disappointment to me in the preparation of this paper, yet my loss in this respect, will, I hope, be your gain—at least in time; since, in consequence, my paper must have the virtues of brevity as well as of originality.

The fact is, in nearly all the works I have consulted relating to the value of fruit-products, I have been able to find but little on the food value of fruits, and what I have found has generally been to the disparagement of fruits. The statement is almost universally made that fruit does not occupy a very high place in the dietetic world, as containing much that is essential or greatly helpful to healthy living. It is usually asserted in the text-books on Food, that while fruit is appetizing, grateful to the palate, pleasing to the eye, it is greatly lacking in, if not really destitute of, the essentials for bone, muscle, blood and nerve making.

Prof. Victor C. Vaughan, of the Michigan University, in a prize essay on "Healthy Homes and Foods for the Working Classes," says: "The real food value of fruits, judged by their chemical composition, is small, but when thoroughly ripe and well preserved they act beneficially upon the system, improving the appetite and maintaining a healthy condition of the various vital organs." He also says: "Probably no fruit is necessary to life, and fruits may be regarded as luxuries, but man's instincts and cravings prompt him to obtain them often, even when their cost is considerable."

I think here is illustrated a proposition that may not be generally accepted, and that is that man's instinct is sometimes—oftentimes, in advance of, and more reliable than his judgment based upon scientific knowledge. It has been asserted that this instinctive desire for fruits is one of the strong arguments of evolutionists in favor of our descent from the ape.

So strong and so overpowering is this instinct for fruit, that I have known persons—not boys only, to even violate the eighth commandment in their determination to have it; and a very old book informs us that this craving for fruit that was "pleasant to the eye and a thing to be desired" was the cause long ago of very much of the grief we have to-day. There is perhaps no more pathetic sight than a group of hungry children with sparkling eyes, dilated nostrils, and watering mouths, standing around a fruit stand with no money to buy and no ability or pity to give.

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Surely an all-wise Creator would not have made fruit so attractive to the eye, so pleasant to the taste, so grateful to the stomach, and so longed for by bird, and beast, and man, unless to prompt the system to demand it as an essential to the proper development of the body.

But laying aside instinct let us consider this subject from a scientific standpoint. In order to do so it may be well to call your attention to some well established facts relating to the nutritive value of food products.

The essential constituents of all food-stuffs may be divided into five general classes. To maintain a healthy standard of living the daily food should contain the following necessary elements:

1. Albumens, or proteids.
2. Fats or oils.
3. Starches, or carbohydrates.
4. Inorganic salts, and
5. Water.

Any article of diet that most nearly contains all these essentials in due proportion might be regarded as a perfect food-substance. Milk, of all substances, is thus the most perfect of all foods, since in the early and growing period of animal life it alone meets all the physiological demands of healthy living.

Adopting this standard, one of the most important elements of a perfect food is wanting in most of all fruits. I mean the first named, the albumens, or proteids. The muscles, blood and all the vital organs contain proteids as their chief constituents, and to preserve their integrity the food taken daily by a healthy working adult must contain at least four or five ounces of albumen, or proteids.

With the single exception of the strawberry, none of our fruits contain an amount of proteids to exceed one per cent. Therefore, to get his required four or five ounces of proteids daily he would have to eat from twenty to thirty pounds of fruit. This would not only be expensive, but distensive to his stomach and ruinous to his digestion.

The second essential element of food I named was "fats or oils." As this is consumed in the body by combustion, it supplies animal heat and thus gives vital energy—very important considerations. It has been demonstrated that about two ounces of fats or oils should be eaten daily to supply the physiological demands of a healthy adult. Fruits, excepting nuts, are totally destitute of fats or oils—except a vegetable oil obtained from the olive, which has some nutritive properties.

The third division I named was "starches or carbohydrates." This includes a large and very important group of substances—the great majority of which belong to the vegetable kingdom. The most nutritious, and hence important food elements in the vegetable kingdom are starch, sugar, gum and dextrine, and many fruits are very rich in these. Like fat, th give energy to the body, although for this purpose a much larger quantity is required—the amount for a healthy man being from seventeen to eighteen ounces per day. To this class of "starches or carbohydrates" belong all fruits—some being much richer, however, in sugar, etc , than others.

The fourth class named was "Inorganic salts." The most of fruits contain these salts in varying proportions.

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The last named division, "water," is particularly abundant in fruits of all kinds.

As about seventy per cent of the adult human body is water, which should be replaced as rapidly as it is evaporated or excreted, substances rich in this element should be used freely.

Milk on an average, even if not supplemented by the pump, contains about 87 per cent of water; meat about 75 per cent; and vegetables and fruits from 70 to 90 per cent. Fruits differ greatly in the amount of water they contain—oranges having as high as 89 per cent, and scarcely any fruit less than 80 per cent.

The most delicious, enjoyable, and important part of fruits, consists in their juices which are largely composed of watery solutions of sugar and acids.

Apples contain on an average 7.7 per cent of sugar and grapes from 14 to 15 per cent. The cellular parts of fruit are not easily digested and contain but little nutriment, hence those fruits are most highly prized which contain the greatest amount of juice with the least per cent of cell structure.

A minute classification of fruits and their relative value for food is not necessary and yet a grouping into three or four natural divisions may be interesting and instructive.

First. The Drupaceous or Stone Fruits.—Such as the peach, plum, apricot, nectarine, cherry and date.

Though some contain more acids, and acids containing organic salts in varying proportion, and others more sugar, yet there is not much difference in their nutritious properties—especially when taken with the substance supplying the lacking desirable properties. As the ripening process advances they cease to grow; they absorb carbon from the air and give out oxygen; the acids and astringent materials they contain to a great extent disappear; the starch is converted into sugar, and those peculiar qualities are developed that give to fruit its peculiar character, its rich coloring, its distinctive smell, its delicious taste, its nutritious properties.

Such fruit constitutes an agreeable, refreshing food, digestible and wholesome, and of a value not to be estimated by their apparently small amount of nutritious material. The date itself is the great food of the Arab, sugar being its main nutritive constitutent.

Second. Pomaceous Fruits.—Apples, pears and quinces are leading representatives of this class.

In the raw state the pear is much more easily digested than the apple; but the apple, because of its keeping quality, whether in a raw state or dried, is an important article of food. The quince, in a raw state, is too astringent, and contains too much acid to be a desirable food, but cooked or preserved and properly sugared to neutralize its acid, it is palatable and healthful in moderation. Cooked apples are more easily digested than raw apples and pears—especially the former are laxative and contain much that is valuable as an adjunct to good feeding.

Third. Baccate Fruits or Berries.—Currants, gooseberries, cranberries and elderberries belong to this group. The currant, gooseberry and cranberry are highly prized for their acidity, and in moderate quantities are not only agreeable and palatable, but advantageous. The seeds and skin being indigestible, if taken too liberally often prove a source of irritation to the stomach and bowels.

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The strawberry, raspberry, blackberry and mulberry are clearly akin, and when fully ripe are delicious and wholesome, though if eaten too freely, especially without other food, because of the large number of indigestible seeds, often produce obstruction or irritation to the bowels.

The banana (*Musa Sapientium*)—The chief food of the Brahmins—the wise men of the east—and the plantain are highly prized in the tropical countries where they constitute the chief article of food. When ripened in their native climes they are delicious and highly nutritious, as they are rich in saccharine, and other desirable food-properties.

The orange tribe of fruits because of their aciduleus juices are highly valuable to stimulate an appetite, and as preventives of scurvy. They also furnish very agreeable acidulous drinks that are especially refreshing in the summer. Except the grape there is no fruit so useful in sickness, and so little likely to disturb the bowels even of children as the orange. The seeds and pulp should always be rejected.

The fruit, however, that is a favorite everywhere and with everybody, that has been immortalized in poetry and song because of its lusciousness, as well as refreshing qualities, is the grape. It contains a large amount of sugar—grape sugar, which is easily assimilated by the system and in consequence is highly nutritious. It is most agreeable to the taste, refreshing and cooling and may always be taken, not only with safety, but with much profit by all—even invalids.

Without further specifying particular fruits, many of which I have omitted, I wish to state briefly some of the physiological and dietetic advantages of fruits.

They lessen the force and action of the heat in summer; cool the blood; refresh the system in the debility of summer and correct errors of digestion. The acid fruits are especially anti-bilious and anti-scorbutic and incite the liver to healthy action, and act upon the bowels causing healthy and natural evacuations. When taken with other food they greatly aid in peptonizing it; that is, in preparing it to be more easily digested and assimilated. Figs, peaches and prunes when taken with other foods act upon the albumens or proteids contained in them, break them up and greatly facilitate their absorption by the vessels of the intestines.

A couple of comparisons may be interesting as shown by analysis:

1 pound of starch, or 5 lbs. of potatotes are as a food product equal to 5¼ lbs. of grapes, 6¼ lbs. of apples, 11 lbs. of currants and 12 lbs. of strawberries.

The albumen of one egg is the equivalent of 1¼ lbs. of grapes, 2 lbs. of apples, 2 lbs. strawberries and 4 lbs. pears.

While these comparisons speak well for fruit as a food there are other and more subtle qualities which analysis fails to discover though they are just as real and obvious in their beneficent effects upon the system. Fresenius says on this point "All fruit contain albuminous or protein substances which are tissue (making) foods. However they are not taken so much for this reason as for their vegetable salts and agreeable flavors." They thus not only contribute in a large proportion many invaluable and necessary elements but are real tonics and invigorators.

Perhaps I should refer briefly to preserved fruits—dried or canned.

While nearly all fruits are eaten either raw or cooked, there are some which cannot be preserved or kept in their natural condition and must be dried.

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The importance of dried fruit as food is not sufficiently understood or appreciated. As fruit loses a large part of its water in drying the nutritious parts are left for our use in a more condensed form.

Bread is called the "staff of life," and science shows that dried apples are very near to bread in their per cent of nutrient material; and the dried pear is so generally used in Germany as to be called the "date of Germany." While this fruit is too expensive with us, a writer says he has seen dried pears in Germany commonly exposed for sale by the barrel, and they are eaten by the common people in great quantities. They make dried pears and apples into a variety of toothsome and nutritious dishes with meats, potatoes, beans and maccaroni.

Canned fruits if properly put up, differ little, if any, from raw fruits. If put up with syrups they are richer in saccharine material and hence more nutritious. They should not contain any salicylic acid or other drug as they with care can be as well preserved without such positively injurious substances.

Three general rules should always be observed in the selection and use of fruits—quality, quantity, and occasion.

All admit that imperfect or impure bread, meat, or milk, are unfit articles of diet; and yet when perfect in quality they must be partaken of in proper quantities and on fitting occasions. So with fruit.

Quality. It must be fresh, sound, clean and ripe. Pasteur the great French scientist, has shown that all fruits and vegetables when undergoing even a partial process of decay, contain numerous bacteria, which under certain circumstances, if taken into the human stomach, might become a source of disease. Hence fruit should be fresh and sound.

Clean fruit is even more important since it has been shown that fruit grown near to the ground may contain dangerous bacteria, such as produce typhoid fever, tetanus, diphtheria, or cholera, which have found their way into the manure used for fertilizing, or have become incorporated with the dried dust. Hence one should never neglect to cleanse the fruit under the impression that sound fruit is the equivalent of safe fruit. Especial care should be taken with imported or shipped fruits, more particularly when known to be from districts where there are infectious diseases. Such fruit may be soiled in handling or may be covered with bacteria-laden dust. The only safe course under such circumstances would be to wash it thoroughly and strip it of its outer covering or, if suitable, cook it.

Fruit to be suitable in quality therefore, should be fully ripe, as green or imperfect fruit is always a menace; nor as I said before should it be so over ripe as to have entered upon its process of decay; it should be clean and sound.

Quality. No rule can be laid down specifying the amount of fruit required, or appropriated comfortably and safely by the stomach. While fruit is a desirable food and an apparent necessity, it is also a luxury and should be eaten in moderation. It is not a safe thing to fill up on. Experience and good judgment will be the best guides.

When should fruit be eaten? It is an old adage and a truism as well that "fruit in the morning is golden—at night leaden." It is best used as a supplement to other foods—best taken at meal time. As it is lacking in some essentials of a perfect food, and rich in others, it will be readily seen

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that taken with other food the best results are obtained. It has been found that fats and fruits are not congenial companions in the stomach, and their contemporaneous presence in the stomach is often the occasion of a severe falling out—thereby entailing not only severe pain, but a useless waste of raw material.

In conclusion I wish you Godspeed in your enthusiastic efforts to secure for our grand commonwealth fruits the most varied in kind, the most abundant in quantity, the most perfect and nutritious in quality, believing that by so doing you most effectually promote the health and wealth as well as the pleasure of yourselves and of the people.

On motion, Dr. J. F. Kennedy was made an honorary member.

DISCUSSION.

G. B. BRACKETT: I met at the World's Fair a gentleman from England, who was a member of a society to promote the use of fruit as a diet. This gentleman had not eaten anything but cereals and fruits for four years, and enjoyed perfect health. He found that fruits, including nuts, furnished all the oil needed by the system. He uses largely figs, dates, raisins, nuts and other fruit. The society of which he is a member sends out pamphlets advocating this diet. I have sometimes lived for three or four days at a time exclusively on grapes, changing from one variety to the other.

SILAS WILSON: I wish to emphasize Col. Brackett's statement as to the value of grapes as food. Nothing will satisfy my appetite better than grapes fresh from the vine. I have lived for days almost wholly on fruit. Many persons, however, find that fruit does not agree with them. The eating of many kinds of grapes at any one time is confusing to the sense of taste. I have taken visitors into my vineyards and after sampling thirty or forty varieties they would find themselves entirely unable to distinguish them by the sense of taste.

THE SECRETARY: The dried apple industry is now one of considerable importance, and there is a good market for select dried apples. The Oldenburg has been found to be one of the best for this purpose. There is an opening for millions of bushels of Oldenburg for drying. In purchasing dried fruits we should avoid those that are bleached.

R. D. MCGEEHON: I find peaches and grapes excellent for forming a large part of the diet in the proper season.

M. J. WRAGG: Are grape seeds injurious any more than the seeds of raspberries, blackberries or other fruits?

DR. KENNEDY: Grape seeds are more bulky, and there is danger of inflammation of a certain portion of the bowels, caused by the seeds working into the vermiform appendix. Otherwise they are not more harmful than raspberry or blackberry seeds. In my practice I

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have observed more trouble from indurated lumps of seeds of raspberries and especially of blackberries. Apple seeds may be digested, but not readily.

ELMER REEVES: Is bleaching of dried fruit injurious if no zinc trays are used?

DR. SMITH: This question was investigated a few years ago and it was found that bleaching dried fruits was not injurious except when zinc trays were used. But it always impairs the fruit flavor and should be prohibited by law.

On motion it was resolved to send a delegate to the Nebraska State Horticultural Society meeting.

MORNING SESSION—THIRD DAY.

Session opened at 9:30.

The report of the fruit committee was first in order.

REPORT OF COMMITTEE ON AWARDS.

NOTE.—To save space the full list of awards on named plates of apples and vegetables is not given.

Best collection of fruit grown in any county in southern Iowa, awarded to Mills county, represented by J. W. Murphy.....$20.00
Second premium, Adams county, represented by A. F. Collman..... 10.00
Best collection of fruit from central Iowa, awarded to Polk county, represented by C. O. Garrett..... 20.00
Second premium, Woodbury county, represented by B. Shontz..... 10.00
Best collection of fruit from Northern District, awarded to Black Hawk county, represented by R. P. Speer 20.00
Best collection of apples grown by exhibitor, awarded to J. W. Murphy, Glenwood..... 10.00
Second premium J. F. Williams, Glenwood..... 5.00
Best collection of seedling apples grown by exhibitor, awarded to C. O. Garrett, Ivy..... 10.00
Second premium, W. H. Farnham, Dallas county..... 5.00

The committee specially commend to favorable notice Mr. Farnham's seedling of the Jonathan.

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Best plate of any variety, J. W. Murphy, of Mills county, was awarded a premium of $1.00 on each plate of sixty-four varieties of apples, and 50 cents (second premium) on each plate of ten varieties.

C. O. Garrett, of Ivy, was awarded a premium of $1.00 on each plate of sixteen varieties of apples, and 50 cents (second premium) on each plate of ten varieties.

A. F. Collman, of Corning, was awarded a premium of $1.00 on each plate of five varieties of apples, and 50 cents (second premium) on one plate.

R. P. Speer, of Cedar Falls, was awarded a premium of $1.00 on each plate of twelve varieties of apples, and 50 cents (second premium) on each plate of five varieties.

A. L. Plummer, Ivy, was awarded $1.00 on each plate of two varieties of apples, and 50 cents (second premium) on each plate of two varieties.

PREMIUMS ON VEGETABLES.

Best collection of table vegetables, first premium, A. L. Plummer, Ivy.$10.00
Second, J. W. Murphy, Glenwood..... 5.00
Best collection grown by exhibitor, first premium, J. W. Murphy..... 8.00
Second, A. L. Plummer..... 4.00

Best plate of potatoes, J. W. Murphy, Glenwood, was awarded $1.00 on each plate of nineteen varieties, and 50 cents (second premium) on each of four varieties.

A. L. Plummer, Ivy, was awarded $1.00 on each of five varieties of potatoes, and 50 cents (second premium) on each of six varieties.

Eighteen first premiums at $1.00 each, and 8 second premiums of 50 cents each were awarded on various varieties of sweet potatoes, beans, table beets, parsnips, table carrots, onions, salsify, celery, turnips, sweet pumpkins, squash and sweet corn, J. W. Murphy being awarded 9 first premiums and 5 second premiums, and A. L. Plummer 9 first premiums and 3 second premiums.

The committee recommended that the article alluding to the disposal of premium fruit, on page 18 of the report of 1892, be strictly adhered to.

M. J. WRAGG,
F. E. PEASE,
W. H. SHAUL,
Committee.

ARE BEES NECESSARY TO THE PROPER FERTILIZATION OF FRUIT?

BY W. S. FULTZ, MUSCATINE.

The assertion has often been made by horticultural journals and bee papers that the honey bee is an essential to the perfect fertilization of fruit blooms, and that without the aid of bees the fruit grower could not carry on his business with any certainty of a crop. So that the public has come to believe that such is really the case. Bee journals have been very persistent in asserting that without bees there would be no fruit, especially whenever any fruit grower charged that bees destroy fruit.

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In studying this question we naturally go back to the early history of the country, and find that the first settlers of this country found in many places wild fruit growing in abundance. In many parts of the country there were nut trees of various kinds that showered down their nuts each autumn. Within the almost boundless forests trees of all sizes, from the tiny yearling to the giant monarch grew and flourished. This shows conclusively that the nuts and seeds of the forests had been properly fertilized for centuries before the advent of the white man. History also informs us that the first white settlers of America found no honey bees and that the first bees introduced into this country, the German or brown bees, came from Europe.

What then was it that fertilized the wild fruit bloom, the nut and other trees of the extensive forests of America, saying nothing of the corn, tobacco and other crops raised by the Indians? In discussing this question with bee-keepers, they always refer me to the fact that there were bumble bees, wasps, hornets and other honey-gathering insects in the country. But when asked how many of these insects there were in each nest at the time trees usually are in bloom, they are obliged to admit that the queen was the only one, and the utter impossibility of her performing the extensive fertilization necessary.

When the first settlers from the United States went to California they found there various kinds of fruit growing. Many of the old Spanish missions were noted for fine fruits. The same is true of Oregon and Washington, yet no honey-bees were there. We have a true account of the first attempts made to introduce the honey bee on the Pacific slope, but it would make this paper too long and is not germane to the subject. It is sufficient to say that fruit of various kinds, both wild and cultivated, was raised without the aid of the honey bee. The Mormons found the same state of affairs existing in Utah.

So much for history, now for personal observation. The winter of 1871-72 will long be remembered by the bee-keepers of that time as one of great disaster. Fully 75 per cent of all the apiaries of eastern Iowa and western Illinois were wiped out of existence, and nearly all of those left saved but three or four hives. The surviving colonies were very weak during the early part of the following summer. Several apiaries with which I was acquainted, containing a hundred or more hives, were entirely wiped out, and bee-keepers in Muscatine county and in the adjoining county of Mercer in Illinois, sent to western Kentucky for bees to get a new start. These were not brought until after first fruit bloom. The cause of the great mortality was said to be poisonous honey gathered during the previous summer. In the summer of 1872 we had a good crop of fruit, with no bees to fertilize the bloom. I have also a record showing it was a good year for nuts, and that walnuts and hickory nuts were plenty.

I wish to call attention to the methods in vogue for securing the proper fertilization of strawberries. As a fruit-grower, no member of this society would think of planting any pistillate variety of strawberry more than sixteen feet from a staminate variety. If he did, he would not expect to secure much of a crop. If, as has been so often asserted, proper fertilization is secured by the honey bee, then there would be no necessity for this close planting, as the bee usually in its flight from flower to flower covers much more than this distance. I must, however, say, after close observation in

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my twenty years' experience as a fruit grower, that I never knew bees to work on strawberry bloom to any great extent. Some years they scarcely visit the strawberries at all when in blossom, and yet the crop was good, showing conclusively that the fertilization of the strawberry is accomplished without the aid of honey bees.

As boy and man, I have kept bees for over forty years. During the first thirty years of my experience I frequently sowed buckwheat so that the bees would have fall pasture, but I have to record the fact that more than half the time my bees never gathered a pound of buckwheat honey. Yet it never made any difference whether the bees worked on buckwheat or not, I raised a crop all the same. Nature did its own fertilizing. Four years ago one of my neighbors had five acres of buckwheat within a half mile of my apiary of thirty-five hives of bees, and I watched that buckwheat closely in hopes of getting a good supply of fall honey. But my bees never visited it and I got no buckwheat honey, but my neighbor raised a good crop of buckwheat.

Basswood is one of our best sources of honey. Some seasons I have known basswood trees to be laden with bloom with the bees working on it in swarms from daylight until dark. The same year the trees would be full of seed. Other years the trees would be full of bloom and not a bee would visit them, yet the trees would be loaded with seed. The past summer was just such a season with us. Every day during the period of bloom I passed several basswood trees from four to six times in making my trips to market with berries. Although the trees were fairly loaded with the large clusters of bloom, a careful watch never showed a single honey bee. Yet those trees were properly fertilized, as shown by the large crop of seed.

I have been living at my present home for twenty-two years, and in my door-yard are several good sized oak trees. I have watched them and find that some years the bees work on the bloom and other years they take no notice of it whatever. Yet it makes no difference whether the bees work or not, the trees raise acorns every year when they bloom.

We sometimes see the statement made that some kinds of fruit trees in certain localities failed to produce fruit, and that the introduction of bees caused an entire change, the bees being credited with fertilizing the bloom and thus causing the trees to be fruitful. This claim in the absence of more pronounced experiments is not to be relied on. Many orchards have failed to bear for a number of years and then became fruitful, although bees were plenty each year. In the spring of 1892, my orchard bloomed profusely, as did all other orchards in Muscatine county. The spring was rather wet but yet there were days when the bees worked briskly and gathered the honey and pollen. Yet we had no fruit. The cause of the failure was not for want of proper fertilization. The present year we had no apples and other tree fruits were scarce, and the cause of the failure was not for want of proper fertilization, but from other causes. We are in hopes of a good crop of fruit next year and if we get it we will not give the bees the credit as they have failed to give us a crop the past two years. Should the same calamity that overtook the bees in the winter of 1871-72 again wipe them out of existence, and we still get a good crop of fruit next summer, we will not blame the bees for our failure the past two years for we know that the causes have been entirely outside of any influence they may have had.

More might be written on this subject but I will only add that I believe nature has furnished every living species the power to reproduce its kind within itself.

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BEES FROM A HORTICULTURAL STANDPOINT.

BY EUGENE SECOR, FOREST CITY.

It is an old and true saying that nothing was ever created without a purpose If we do not always discern at first glance the purpose of the Creator, it is because we do not understand His ways.

The adaptation of means to ends is beautifully illustrated in nature. Plants and animals are dependent on each other for the highest development of both or either. Our nutritious grasses illustrate this truth. Blue-grass is only found in its perfection where cattle feed upon it and spread its seeds in nature's way. And the noble Short-horn is only possible where such rich grasses abound.

One of nature's laws, which like those of the ancient Medes and Persians, never changes, is, "Thou shalt not inter-marry." In-breeding is as repulsive to inanimate life as to civilized society. But plants are unable to travel and seek their consorts in remote family connections. Insects, however, *do* travel, and since the pollen dust which is provided in the blossom as the life-giving element to other flowers, is just the food needed to develop the larval insect, the bee, as well as all pollen-eating insects, while in quest of the natural food for the young of their kind, in passing from flower to flower, carry the fertilizing dust on their legs and bodies and unwittingly act as agents in cross-fertilizing the plants which they visit.

A bee, in obtaining the load which it can carry on its legs to the hive, probably visits on an average fifty blossoms. Oftentimes these are growing quite remote from each other. Hence the chances are increased that some of the dust adhering to the bee's legs or body will be rubbed against the receptive pistils of plants so distantly related that in-breeding is prevented. It is well known, too, that in many plants the stamens and pistils do not arrive at that particular stage of development where fertilization takes place, at the same time. This is another of nature's plans to prevent too close in-breeding, and another reason why bees and other insects are necessary to the complete fructication of the fruits, as well as the highest development of plant life.

But bees do not always live on the nitrogeneous food which pollen-bearing plants furnish. Mature bees live on honey. This is the only proper food for them after maturity. Hence the nectar in the flowers. It tempts the bee to enter with the hope that some of its pollen dust may be carried to a distantly related plant, or that some already adhering to its hairy body may be brushed against its receptive pistils. The primary object of nectar in flowers was not to furnish man a dainty and delectable sweet, but as an

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inducement to insects to visit the plant and accomplish for it what it could not, unaided, do. The fact that man has learned by observation and experience that bees will gather and store more honey than they need for winter, and has turned the instinct of this industrious worker to his own advantage and profit, does not prove that this is not a secondary object in their creation.

Bees are as necessary in the economy of nature as birds. They take no life from the plant which they visit, but *give* life through fructification and in the added vigor which comes from cross-fertilization. The drop of nectar is no advantage to the plant if not appropriated, for it soon evaporates and is wasted. Bees, therefore, while performing a valuable service to farmers in the fertilization of clover, to the horticulturist in assisting him to a full crop of fruit, to the florist and market gardener by constant and friendly visits, add another resource to rural economies, which without their aid would be scattered to the four winds of heaven.

Bees never injure sound fruit. Although this charge has been laid at their door, all credible expert testimony exonerates them. In the first place they cannot if they would, bite the skin of sound fruit. Their mandibles are not made for cutting like those of the wasp and hornet. When they are thought to be guilty it is generally found on investigation that some other insect or bird is the depredator or that the fruit is decaying from other causes.

In the second place the stuff they get from fruit is not only worthless as food for them but is positively injurious, showing that nature never intended the juice of fruit as food for bees. They never use it or gather it except when natural and proper supplies are exhausted.

There is therefore no reason why the horticulturist and bee-keeper should not be friends. There should be a reciprocity of acknowledgments between them. The one cannot live and prosper without the other. Both avocations may be followed side by side without prejudice and with mutual advantage. The same spirit that outlaws the bee, because, forsooth, we think some one else is reaping where he has not sown, would regard jealously the acquisition of any property or other desirable thing by any other person, no matter if we, through lack of industry or ability, fail to acquire it ourselves.

DISCUSSION.

THE SECRETARY. The opposing views of the two papers read are not so marked as would at first appear. Our native fruits in their native habitats have forest conditions as to undergrowth, leaf mold covering of soil, and general environments. When exposed to the sun and wind under cultivation, they have new conditions which it has been proven may modify and change all parts of the blossom. Again, our cultivated fruits are an outgrowth of long continued propagation and more or less artificial management. In many cases, the abnormal development of pulp of the fruit has weakened the vitality of the seeds, and in many cases produced abortion to a greater or less degree of the blossoms. It will be seen at once without argument that trees and plants in a state of nature may not need the

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insects for fertilization, but that our cultivated fruits not only need the bees, but many of them require mixed planting to give the profitable results.

R. P. SPEER. At Cedar Falls a few years ago many persons had from a dozen to fifty or sixty stands of bees. Fewer people are now engaged in bee keeping, and indeed last spring there were no bees on the wing at the time of apple blossoming on account of the cold and wet, yet some varieties of the apple were well loaded with fruit. And last year, with relatively few bees in the country, all our hardy varieties were well loaded with fruit. Yet it may be that among our old lists of fruits we have some varieties that need the insects for cross-fertilization. In connection I will say that I have had my doubts about the need of bumble bees in the fertilization of clover blossoms. The bumble bees are very numerous some years and very scarce at other times. Yet the good crops of clover seed are as apt to come when the bees are scarce as when abundant. If we say that the clover seed depends on the presence or absence of the clover midge, we will get nearer to the truth.

The committee on treasurer's report reported as follows:

Your committee, to whom the treasurer's report was referred, find that:

At last settlement the amount on hand and charged to this account, was		$ 4,429.55
And by the treasurer received from various sources, the following sums:		
Membership fees	$ 74.00	
Interest on deposits	75.00	
From Auditor of State	2,500.00	
Total	$ 2,649.00	
And a grand total		$ 7,078.55
The total disbursements during the same period were.		4,194.05
Leaving a balance of		$ 2,884.50

in the hands of the treasurer, all of which has been produced by Silas Wilson, treasurer, and by us counted. All vouchers have also been produced and found correct.

J. M. ELDER,
BEN. MCCOY,
C. F. GARDNER.

On motion, the report was accepted and the committee discharged.

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ORCHARD SITES, VARIETIES OF THE TREE FRUITS, AND HOW TO GROW THEM PROFITABLY ON THE DRIFT SOILS OF IOWA.

BY R. P. SPEER, CEDAR FALLS.

Although millions of dollars have been paid for fruit trees which have been planted on the drift soils of the northern two-thirds of Iowa (if we should except the Oldenburg and Whitney), less than two per cent of the trees have proved profitable. Why we have met with so many failures, after so many long and thorough trials, is the question which I will endeavor to answer.

That many varieties of the apple have proved fairly hardy and profitable on the loess soils in the southwestern part of the State, which have failed on drift soils in the same latitude, proves that a very large share of our orchard troubles should be charged to faults in our soils. Drift soils are composed principally of clay, sand, gravel and decomposed vegetable matter in different proportions. On knolls and ridges, drift soils are generally more sandy and contain much less vegetable matter than lower grounds. In several counties west of the Des Moines river and in parts of many other counties, the subsoils consist of impervious blue clay or hardpan, which is overlaid with rich and very black peaty soils. The alluvial soils of creek and river bottoms are very sandy, and generally much sand can be found in such soils down to the water levels. The clayey soils of Davis, Lucas, Monroe and parts of certain other counties are very fertile; but they are adhesive, and after heavy rains it is hard to get rid of the surface water and keep them in proper condition for corn or other crops which require cultivation. The bluff or loess soils in southwestern Iowa are not surpassed by any others in the State for fruit trees. The particles of which they consist are finer than grains of sand; but they are much coarser than the atoms of which clayey soils are made. Stagnant water is never found in loess soils, and their capillary power is great. The decomposed vegetable matter in our prairie soils give them their dark color, and it is called vegetable mold. Like a sponge, it absorbs and holds moisture and fluid plant food. By its gradual decomposition it furnishes carbonic acid, which dissolves inorganic matter in the soil. Our prairie soils contain sufficient quantities of potash, lime, phosphorus, sulphur, iron, etc., to supply the wants of trees and other growing crops; but they suffer very often for want of such mineral substances, because they are not in a fluid condition.

Water alone will not dissolve potash, lime, phosphorus, etc., but such substances are dissolved readily in moist, porous soil by carbonic acid, carbonate of ammonia and other gases of the atmosphere, when it can circulate

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freely through them. During wet weather water passes downward in loose soils to great depths, but on account of their peculiar porosity, it is brought back again by capillary attraction in sufficient quantities to supply the wants of trees and other plants during an entire summer season. The composition of our drift soil varies very much and frequently the difference is remarkable at different places on a small farm. At some places, on account of blue clay or other impervious matter in the subsoil, the surface soil is full of water in wet seasons for weeks during May and June, while it is very dry and hard during the remainder of the season. Knolls and ridges are not suitable for orchards, as they are generally sandy, contain but little vegetable mold and have low capillary power. The best rule to follow is to plant your trees on good ground, where water will disappear from the surface soil in a short time after heavy rains, and where the texture of the subsoil corresponds closely to the texture of the loess soils as I have described them. But the selection of the best orchard sites on our drift soils would not be sufficient to make apple growing profitable if we should continue to plant such varieties of trees as we have planted heretofore. The Oldenburg, Tetofsky and Whitney have ripened their wood every year before winter, while all of the American apples and every variety of the apple from Western Europe. have failed to ripen their wood in unfavorable years, where they received only ordinary care.

To show the necessity for the thorough ripening of the wood of trees before winter, I will give a short summary of important facts presented in a paper which I read before the Iowa Horticultural Society last winter on the physiology of trees: The hardiness of trees in a very cold and changeable climate can be determined more accurately by the different stages of ripeness after their leaves have been killed in the fall by frosts, than by anything else. When trees are thoroughly ripe, all of the starch which they contain, will be concentrated in granular form in their piths, wood-pith cells and medullary rays. In a ripe tree, the pith terminates in a comparatively large, well defined cone of lignified starch from a fourth to a half inch below each terminal bud, and a much smaller cone of lignified starch will be found below each lateral bud. The central parts of the piths of ripe hardy trees are densely packed with granulated starch; while the central portions of the piths of ripe tender trees are generally filled with air. In trees which are not entirely ripe, the cones of granulated starch will be found below each bud; but they will not be well defined, and more or less ungranulated starch will be found outside of them in the wood. When the leaves of trees are killed by frost while they are growing, ungranulated starch will be found scattered through every part of their buds, new wood and secondary cortex. All the albuminoids in a ripe tree are stored in concentrated form in its buds, in the soft tissue between the buds and cones of starch, and in its sieve tubes. In unripe trees the albuminoids will be found at all growing points in very limited quantities and in a watery condition. The sieve tubes of the secondary cortex of trees (inner bark) consists of very long bast cells placed end to end, and their walls are perforated at many points. They are the vessels in which the assimilated albuminous substances travel from the leaves to points of growth where they are needed. Such slimy albuminoids cannot diffuse through cell walls like water or fluid carbohydrates; therefore the sieve tubes are perforated so that their contents may be forced out of them by

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pressure. The sieve tubes are used at all times, but especially during the winter seasons, as store rooms for reserve nitrogenous materials. When trees ripen in the fall, the pores or perforated points in the walls of their sieve tubes are closed by the formation of callus; but they open again after growth has commenced during the following spring.

Dr. Sachs and other eminent vegetable physiologists have stated the facts to which I have called attention above. but as they were not practical fruit growers in a very cold and changeable climate, they do not tell us why the sieve tubes are closed during the process of ripening in the fall. We know that in a ripe tree all its starch is stored in its pith and medullary rays in granular form, and that is well protected by strongly lignified cell walls against injuries by water, which is absorbed from the ground in large quantities frequently by many kinds of trees during warm spells of weather in March and April. We know also that the reserve albuminoids in and near the buds of a ripe tree, are equally well protected by impervious bud scales and otherwise against injuries by water during changeable weather in the spring. If such precautions are necessary to protect the granulated starch in the pith and medullary rays and the concentrated albuminoids in the buds, we would expect that equal care would be used to protect the reserve albuminoids in the sieve tubes from being diluted and injured by surplus water during warm spells of weather early in the spring. When trees do not ripen before winter, the perforated points in the sieve tubes will remain open and all of the albuminoids will be forced out of them by the pressure of water long before the proper season for growth to begin. All the water which is transpired by the leaves of trees during the growing seasons, passes upwards through the walls of the continuous vessels of the sap wood, which send out branch vessels on their way upwards through the parenchymatous tissue to every leaf. A practical fruit grower would ask whether such water channels would prove harmful or not, if they should remain open after the leaves drop in October or November. But Sachs, De Bary and others tell us that during the ripening process at the close of a season's growth, a layer of thick walled cells is formed under the base of each leaf stalk, and it is very evident that this is done to prevent loss of water from the internal parts of the tree. It is not hard to see that an unripe tree would suffer severely by the drying of its wood during a very cold winter, where thousands of points where leaves had been attached to its branches were open.

I will now offer another important reason why trees should be ripe in the fall. The numerous, light colored specks on the bark of young branches of deciduous trees are called lenticels. Although not more numerous, they are more noticeable on the bark of young birches and wild black cherry trees than on other species of trees. The surplus water which accumulates in the intercellular spaces of trees during the summer season is discharged through them, and carbonic acid and other gases inhaled through them also for the use of growing cells. During the ripening process the lenticels are closed with cork; but they open again after the commencement of growth during the following spring. The lenticels of trees which do not ripen before killing frosts in the fall, remain open during the following winter. In such instances, trees are injured frequently during very dry, cold and windy weather by the exhalation of moisture through

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these numerous openings in their bark; while such losses of water from ripe trees are impossible.

From the facts which I have presented, it is evident that nature has done her full share towards guarding our fruit trees against injuries by unfavorable climatic conditions, and if we should use common sense in the selection of orchard sites, varieties of trees, and in giving them proper culture after they are planted, it would not be long until we could not complain about "off years" of apple, plum and cherry crops, or that our orchards were dying on the drift soils of Iowa. The farmers of the northwest have been conducting costly experiments for more than twenty-five years with apples, pears, plums, cherries, apricots, etc., and all that they have learned by such experiments is that it will pay to plant the Oldenburg and the Martha and Whitney crab-apples. We have no reason to believe that anything would be gained by continuing such hap-hazard experiments in the future. As the Iowa Horticultural Society has established sixteen experiment stations in different parts of the State, where hundreds of promising varieties of fruit trees have been on trial for a considerable number of years, it would be best to plant only such trees as have been recommended by a majority of the superintendents of such stations.

As a superintendent of one of the experiment stations referred to above, I will report some of the results of my experiments, which have been conducted on an extensive scale for twenty-seven years. It would not pay to plant any root-grafted or budded trees of any of the American or west European varieties of the apple on our drift soils, except the Wealthy, Fameuse and St. Lawrence. These three varieties can be made to ripen their wood thoroughly every year on our best soils by using clover in the orchard and by heavy manuring. I have tested about two hundred and fifty kinds of Russian apples, and I have found that the only varieties that will be profitable in Iowa root-grafted, are apples which have proved hardy and free from blight several hundred miles east and southeast of Moscow, where the climate is colder, drier and more changeable than in Iowa. I have discarded a considerable number of the apples from this region in Russia because they were not fruitful, and others also on account of the low quality of their fruit. From this class of apples we will be able to select twenty or more varieties that will prove as hardy, fruitful and profitable as the Oldenburg. These apples will vary in time of ripening from the last week in July until March.

The following varieties are very valuable on our drift soils, viz: Thaler, or Yellow Transparent, Repka Kislaya, Oldenburg, Anisette, Vassil's Largest and Hibernal. I would recommend the Gipsy Girl, Cross, Blushed Calville and a dozen others if I were sure that they would prove as fruitful as the Oldenburg.

All kinds of pears and all the improved or tame plums, and all the apricots and peaches of all countries are worthless on the drift soils of Iowa.

The following Russian cherries are hardy, fruitful and good, viz: Spate Amarelle, Early Morello, Brusseler Braune, Bessarabian and No. 24 Orel. The De Soto is the most reliable and profitable plum.

The results of many experiments have proved that we can grow many kinds of good keeping winter apples profitably by top-grafting them on the Virginia and Soulard crab-apples, or other suitable stocks. The Grimes Golden, Black Oxford and Ben Davis are hardy on Oldenburg stocks, but such

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trees are not as fruitful as root-grafted trees of the same varieties. When trees do not ripen their wood properly every year, the bark on the south-west sides of their bodies, and in the crotches at the base of large limbs, is liable to scald during changeable weather in the spring, which proves fatal generally.

To avoid crotch-scalding, the top-grafting should be done on the limbs of three-year-old Virginia or Soulard crab trees, from four to six inches from their bodies. When the grafts are one year old the trees should be taken up and planted in the orchard. It has been suggested that the Silken Leaf, and many other hardy Russian apples, would be good stocks for valuable tender kinds of apples, but the Silken Leaf is not a good stock, for the following reasons: It is well known to vegetable physiologists that the wood of different varieties of trees of the same species differs very much, in that it may be composed principally of large, thin-walled vessels and tracheides, forming a loose, porous mass; or it may consist chiefly of parenchymatous tissue, or of a dense, firm mass of thick-walled vessels and libriform fibres strongly lignified. The wood of the Silken Leaf, Ben Davis and Red Astrachan is of the kind which I have described first. When the bark of such trees is seriously injured by whipple-trees or otherwise, the wood under it will rot to the heart in less than twelve months. The wood of the Oldenburg, Anisette, Tetofsky, and Virginia and Soulard crabs, is of the kind which I described last. Although one-third of the bark may be stripped from the body of an Oldenburg or Virginia Crab tree, the wood will not rot, but it will become as hard as box-wood, and in a few years the wound will be entirely covered with new wood. When we cut the wood of such trees, we find it is hard and gritty, while the wood of the Silken Leaf and Ben Davis is soft.

Good natural drainage is better for orchards than tile-drainage, because the tiles allow the water level to remain too near the surface of the ground. On well drained soils, which have subsoils of such texture that water will rise in them rapidly by capillary attraction, trees will not drop their fruit prematurely if other surrounding conditions are favorable When the soil in an orchard is full of water in May and June, much of the fruit will drop on account of a scarcity of plant-food; and such soils become so dry and hard during the latter part of summer, that trees can procure only a small share of the food and moisture necessary for healthy growth.

Fruit grown on trees which have suffered on account of wet soils and drouth, will be of inferior quality, and it will not keep like fruit that has been grown on good, well drained soils. When fruit trees stand on soils that are very wet during the latter part of May and the first half of June, they can not form well developed blossom buds to produce the next year's crop. In fact, many trees which produce only one crop of fruit in two years would bear annually if they could procure fair supplies of water and plant-food from the soil during the entire seasons of growth. To have healthy and fruitful orchards on our drift soils, it is necessary that the trees should be surrounded as nearly as possible by the conditions that are found in a healthy forest. I would plant fruit trees closer than usual for the purpose of shading the ground and keeping it cool. To increase the quantity of vegetable mold in the soil, which is necessary to attract and hold moisture, I would apply a liberal dressing of stable manure every third year. I would

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grow nothing in the orchard after the trees had made three years' growth, except clover and buckwheat, and I would never move a crop from the ground after cutting it. Do as I have suggested above, and the little one-acre orchard will prove more profitable than any other ten acres of the farm.

DISCUSSION.

C. L. WATROUS: The fruit-grower should at times go into the surgery business. If a valuable tree is suffering from an injury, we should not let the tree die without making an effort to save it by binding up the wounds and giving it the best of care.

R. P. SPEER: I regard this as a very important matter. On the stems of some unmanured trees of Fameuse that were badly bark-bursted, the bark stood out so that the hand could be inserted between the wood and the bark. The next spring some new bark began to form from the edges of the sound bark. I should have protected the wood from the air to aid in the process of healing.

C. L. WATROUS: Following the practice of a surgeon, we should cut off such injured portions of the bark smooth and apply grafting wax and wind with two or three thicknesses of muslin. This would prevent access of air and answer for an artificial bark until the wound was healed.

W. H. GUILFORD: The question of top-grafting is a very important one. Our experiments in this line should be guided and directed by a committee from this society. This would save time and unnecessary duplication of work. In 1877 I began top-grafting on Whitney No. 20, and still continue the experiments. I find it a very good stock for some varieties, and a very poor one for others.

H. W. LATHROP: I agree with Capt. Speer's views on top-working and manuring. There is nothing more important in farm management than barnyard manure well applied. One of my neighbors at Iowa City has not manured his orchard for twenty-five years, while I manured my orchard as needed and have been well repaid in the greatly superior crops of fruit. I began top-grafting on hardy stocks in 1865 and also put out the same varieties on their own roots. My Ben Davis and Jonathan top-grafted are living to-day, while those root-grafted have been gone several years.

DR. SMITH: In our efforts to heal the wounds of trees we should not neglect anti-septic solutions, to destroy the spores of fungi, which cause decay. A neighbor covered some decaying wounds of two White elm trees with coal tar and they healed over.

J. C. Ferris offered a resolution on the relations of C. L. Watrous and the Iowa Columbian Commission. The resolution passed, but was rescinded at the afternoon session, and referred to the board of directors for final action.

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OUR BEST FRUIT SOILS.

BY PROF. HERBERT OSBORN, AMES.

It seems to me that it would have been better to refer this subject to some specialist in geology or to some one whose experience or study of the subject would have enabled him to test it more thoroughly than I. Since, however, it has been assigned to me I will endeavor to make some suggestions concerning the matter with the object of opening the subject to discussions and in hopes that there may be others present who can contribute from their experience, with the result of some practical information. It is a matter of quite general observation that soils differ materially in their capacity for fruit production, and this variation does not seem to correspond entirely with the variation of soils in capacity for producing grains or certain other crops. Moreover, it is not in many cases, an easy matter to ascertain just why these valuable soils are capable of greater fruit production, the fact merely being observed and the reasons for it not being well understood.

There may be two principal reasons why certain soils are better adapted for fruit-growing, aside from such as may be connected with climatic conditions.

The first of these is the constituency of the soil or chemical substances included in its material. The second the physical condition of the soil, the character and arrangements of the particles which affect the circulation of water and air, and the penetration of roots. Probably this latter condition is fully as important as the first one, although it is doubtless in some degree dependent upon the first, chemical composition in many cases having much to do with the physical properties of the soil. Referring to different kinds of soil which are especially adapted to fruit growing, we have in the loess soils a combination of the properties which appear to be most favorable in this direction and these soils may well be taken, first, as a special subject of study with reference to the conditions which are most desirable in a fruit soil. The loess is a deposit evidently from an extensive body of fresh water having an exceedingly slow current passing through it so that the particles deposited are much finer than those deposited as ordinary river silt. They are exceedingly porous, furnishing remarkably good drainage and at the same time retaining a certain amount of moisture and bringing it near to the surface. So far as their constituency is concerned we doubtless have many other soils in the State either with the same or nearly the same materials but in which the physical condition is so different that the soils do not present the same valuable qualities in the production of fruit.

The question arises, however, whether it would not be possible to produce similar conditions in such soils by proper drainage, or from treatment

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of them, to produce physical conditions similar to those presedted by the loess. It would seem quite probable that many of the lighter clay soils would be especially valuable for these purposes, and it would seem a matter well worth effort to attempt to produce in these soils the same physical conditions contained in the loess with the hopes of obtaining as desirable fruit soils. This is a subject in which observation or experience is of especial value, and a careful comparison of data by different orchardists from different localities, stating carefully the particular properties of the soil which they have found best adapted to fruit production, would be particularly valuable. There is, doubtless, a general consensus of opinion among the more experienced of fruit-growers, and they doubtless select the soils in their particular localities best fitted for their work, but it would be useful to younger members of the society to have this information, and particularly the reasons stating why certain soils are better adapted to fruit-growing. If they could understand the qualities that are necessary, those that are fundamental and inherent in the soil itself, as well as those qualities which can be produced by drainage, or the application of various fertilizers, it would enable them to profit more fully by experience of those who have passed over this ground before.

In the analysis of soils which has been undertaken by the geological survey we will doubtless secure valuable information concerning the character of the soils in different parts of the State, and this will no doubt be of great service in the primary location of parties who intend to make fruit-growing a business. On the other hand, it seems to me important that fruit be grown more extensively at all points, and that where the soil is not originally of the best character for this purpose, the soils most available for this and the methods of adapting it to fruit-growing be understood.

DISCUSSION.

PROF. OSBORN: The investigation of soils by the Iowa Geological Survey, will be of great benefit to fruit-growers. Samples of soil should be sent to Prof. G. E. Patrick, Ames, Iowa, who will furnish directions for taking samples.

THE STONE FRUITS IN 1893.

BY PROF. J. L. BUDD, AMES.

This topic was assigned the writer in 1890 and also in 1891. At this time a few notes will be given on the lessons of the past peculiar seasons and some new experiences in propagating the plum, cherry, and other stone fruits.

THE PLUM.

As Affected by Drought.—On the college grounds at Ames, and over a large

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prairie section of central Iowa, all our standard native sorts, and some of the Russian varieties, were well laden with fruit, but the long-continued drought following the spring rains so affected the fruit that it was dwarfed in size and lower in quality than at any time since our present varieties have been cultivated. We gathered at Ames many varieties for the Columbian Exposition, but they were so inferior that they were not forwarded. Investigation will show that the fine specimens in the Iowa exhibit at Chicago were grown on the loess soils of the west slope, on sites, in the prairie districts and on the bluffs, with a deep, porous subsoil, or in neighborhoods favored with timely summer showers. The lesson favors the belief that our most favorable sites for commercial plum growing are to be found on soils underlaid with a porous subsoil, permitting the ascent of moisture from below, as we have every reason to believe that we will have more frequent protracted droughts in the future than in the past. Yet it must be kept in mind that we now have varieties of the plum which every home owner in the state can plant with a reasonable certainty of gathering paying crops of plums at least four years out of six.

As Affected by Cultivation.—During recent years we have had quite a boom in plum tree planting. In all our well settled neighborhoods we now have bearing trees of our best known varieties under varied management, from that of high culture on rich soils to the trees standing in blue grass sod. As noted the fruit has not been up to the standard size and quality over a large part of the State with the best of culture on manured soil, but it was valuable for home use and has found a ready market this off season. But on dry soil with poor culture or no culture the trees have been low in vitality with a show of dead branches, and the fruit literally dried up on the branches or so small and poor as to be not worth gathering. In blue grass sod many trees of the De Soto, and some other native sorts, have literally dried up and died.

The lesson impressed is that the plum is native to rather moist thickets, and our best plums of the early days were on north slopes or rich soil with the leaves and leaf mould of many years beneath them, and that it bears drouth in isolated positions less perfectly than many of our native trees. As never before we have been taught in every part of the State that the plum needs rich soil and the best culture to give the best results.

Results of Heading-back.—Many of our native and foreign plums make rapid growth when young with good culture, and when they come into bearing the plums on the long exposed branches are sunburned, especially such seasons as the two last. In California the same trouble is experienced, which has given rise to the common practice of shortening the annual growth of all the stone fruits during the leafless period. This results in a closer, more compact top that shelters the fruit. This plan has been tried with the most satisfactory results in Iowa. With this management even the Speer plum is a success, but without it a large per cent of the fruit is sunburned on the tree.

Top-working.—Recently we have had much experience in top-working in the State. Our native stocks have been mainly used. If the work is done on pleasant days in March, success is as uniform as in grafting the apple, and the scions make rapid growth the first season. With amateurs a drawback to the work is the constriction of the stock below the graft. This arises from the ascent of the sap in the new wood during the time when the gratt is extending growth. For a time the ordinary circulation of the tree is suspended. In June, when the period comes for the depcsit of a new growth of wood under the bark, the outer layer of bark has become so hardened that it cannot expand. Literally, as Prof. Turner has

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said, "the trees die from the effects of tight-lacing." The remedy is to peel off the external covering, or if this takes too much time, slit the outer bark in four or five places from the graft to the earth.

We have discovered no gain in top-working our best natives or the hardy Russian sorts. The greatest gain is in top-working the Wild Goose, Milton and other best varieties of the Chicasa species on hardy stocks for northern culture; and in top-working the Ogon, Boton, Kelsey and Burbank on hardy stocks for fruiting north of the point where they are hardy as root-grafts or budded trees. At Ames the Wild Goose seems hardy on native stocks, and the Japan sorts have proven hardy and fruitful so far as our experience has extended when on hardy stocks. But root-grafted or budded trees of all varieties of this grade of hardiness we have found unreliable during our test winters.

We have also found a gain in the way of early bearing. On the college grounds we picked the past season fine specimens of at least twenty varieties of half hardy plums from plum grafts put in the top of native stocks two years ago, while we did not get a specimen from any of the varieties named above from 4-year-old root-grafted trees.

Apricot Stocks for the Plum.—Last winter we root-grafted 2,000 Russian apricot seedlings with a number of varieties of the plum. In no case did we get a stand of one per cent, while our crown grafts on native roots gave us an almost perfect stand.

Sand Cherry for a Stock.—All our experience and observation favors the belief that all varieties of the plum will take well by budding on the Sand cherry (*Prunus pumila*). Our success in budding the past season on this stock has been more perfect than on native (*Americana*) stocks. It is also true that trees budded in the State four years ago have made a very perfect union as is indicated by divided sections of the point of union. So far as examined the union of cells is more perfect than on native stocks. The gain in the use of the Sand cherry for budding is a more bushy spreading habit of growth, and we believe earlier and more continued bearing, yet to some extent these conclusions have not been fully verified. We can only say that its use is very promising.

The Plum on Own Roots.—In the plum and prune growing portions of Europe the use of sprouts, and of trees grown from root-cuttings, is universal. In this country as yet but few trees have been grown from root-cuttings, but these have confirmed the belief common in Europe that they are hardier, longer lived, and that they bear better than budded or grafted trees. However this may prove in the long run, we have these facts in favor of the trees from root-cuttings:

1. If we have trees on their own roots it is a cheap, certain and rapid method of propagation.

2. If they throw up sprouts they can be set in nursery rows and will soon develop into fine trees. Several Europeans who visited the World's Fair expressed wonder at the universal use of poor seedlings in propagation of all the orchard fruits. Without dissent they expressed the opinion that all the stone fruits, as well as the apple and the pear, gave longer lived, healthier and more fruitful trees when grown from seeds or root-cuttings.

Plum Knot.—We place this last in our plum notes, but it is first in importance. In some of the older states east of the lakes it has become a fatal drawback to amateur plum growing and it is appearing over all parts of the west. No variety is exempt from its attacks, yet some sorts are more subject to it than others.

The certain remedy is to cut off the knots and paint the exposed surface with

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kerosene. If the excrescence starts again on the sides, shave it off and apply kerosene as before. Some of our plum growers now carry a vial of kerosene and apply it whenever an incipient knot is discovered. With care an orchard can be kept entirely free from this serious disease. If a tree has been neglected and is covered with knots cut it at once and burn it.

THE CHERRY.

Effects of Drought.—All that has been said of favorable soils and good culture for the plum will apply with equal force to the cherry, except that the cherry will thrive on sandy soils where the plum will grow less perfectly. Yet we now have varieties that will do well in ordinary seasons on every homestead in the State. The effect of drought in Story county, and over a large part of central Iowa, affected the blossoms peculiarly in 1893. The protracted drought of 1892 arrested the development of the fruit buds. Last spring the trees were loaded with fruit buds in perfect condition, apparently. But they were tardy in opening, and when they did expand, it was with leaf bracts rather than blossoms. In parts of the State with deep porous subsoils, or with timely summer showers in 1892, the crop of blossoms and fruit was from fair to good.

Spot Disease of Leaf.—We have much talk about spraying the foliage with Bordeaux and other mixtures to arrest the fungous diseases of the leaf. Our experiments at the college favor the belief that this remedy faithfully applied will prove effectual. But the average growers for home use will not give the needed attention. Hence we will be obliged to select varieties not subject to this disease, such as Bessarabian, Griotte du Nord, Griotte Precoce, King's Amarelle, Lutovka and others from east Europe.

Mahaleb Stocks.—The evidence accumulates each year that the colored-juiced varieties will not make a good union with the wood of the Mahaleb when budded. Each year also confirms the opinion that the uncolored-juiced varieties will not thrive on the Mahaleb on common black prairie soils, but it is all right on dry ridge soils with lighter color, if planted deeply, so as to protect the stock during our open winters.

Trees on Own Roots.—The reports in regard to the behavior of the Wragg cherry are conflicting. Those sent out by Mr. Wragg and others, on own roots, are thriving on dry soil over a large part of the State; those on the Mahaleb are a failure everywhere if they do not root from the scion; and those on Mazzard or Morello roots are only successful on certain soils. On the college grounds we put out a number of trees of the Bessarabian in orchard on Mahaleb roots. By their side we put out a still greater number on their own roots and on Mazzard roots. Those on Mahaleb are all dead, those on Mazzard are all good thrifty trees, but those on own roots are so much superior in size and thrift as to be distinguished half a mile distant. On higher, drier, lighter colored soils this difference will not be so manifest. The only point we wish to make is that evidence increases each year in regard to cherry trees on their own roots, and that in bud ing and grafting we should give more thought to the stock used.

Bird Cherry for Stocks.—We are glad to report the specimens on the college grounds and over the west on this stock from six to ten years of age continue to show a perfect union of both the sweet and sour varieties. When the stocks become commercial we can safely use them for budding, as they are hardy in the far north. They sprout some during the first stages of growth, but while the stocks are scarce this is an advantage. After the trees come into bearing the heavy demands of growth and fruitage leave no reserve material for sprout growth.

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Sand Cherry for Stocks.—As yet we have no confirmed or extended evidence that the cultivated cherry will make a perfect union with the Sand cherry (*Prunus pumita*). Budded in the season of working the Mahaleb we have not had even fair success. But the past summer about nine hundred buds of several varieties were inserted before we beg n budding the plum. These have taken very uniformly and look well at this time. It may prove a valuable stock as we already know it to be for the plum. It is also well to state that what is known as the "Improved Dwarf Rocky Mountain Cherry" is much nearer allied to the cherry in wood, bud, blossom and fruit than the Black Hills form which we have used for stocks. We shall try this for cherry stocks, and also for hybridizing in the near future. From this family will come, I believe, the future stock for dwarf cherry trees for northern culture.

Close Planting.—In the hot portions of France and Spain low cordon training of the cherry, and training on north walls, is general. The object in view is protecting the stems and fruit from the direct rays of the sun. Increased experience favors the belief that we can accomplish the same results by close planting north and south, with wide space between the rows for air circulation. In the west we now have many object lessons of this kind. The Morello varieties will succeed grandly planted only six feet apart in north and south rows. But the space between the rows should not be less than twenty-five feet. Trees planted in this way soon grow together, but they spread out at the sides, forming a wide matted row that will give good crops when isolated trees will be fruitless. Even taller growing varieties, such as Lutovka and Yellow Glass will prove more profitable in these matted rows.

The Peach.—Some of the Bokara and North China peaches are doing well and fruiting well in sheltered positions on rather high bluff and loess soils south of the forty-second parallel. On lower black soil, and in the north half of the state they are only valuable when covered in winter to protect the wood and fruit buds. The hardy peaches are more valuable for laying down than any of the Persian strain for the reason that they ripen their wood more perfectly in autumn. The best plan for laying down has been given in former reports.

The Apricot.—Our former belief is repeated, that none of the Russian apricots are worth growing as their fruit is not as valuable as the Wyant plum.

The Shense apricot is hardier than any of the Russian sorts; it is also hardier in fruit blossoms, and the fruit is larger and better in quality. In parts of the State where it is not hardy enough it will pay to lay it down.

Prunus Simoni.—In our climate, when ripened in the house like a pear, this is a peculiar and noble fruit. It is less rampant in growth than the peach or apricot, and ripens its wood very perfectly in the fall. Hence it is easy to lay down and practice has shown it capable of bearing heavy crops in all parts of the State when protected. In the south part of the State it will pay to protect the early opening blossoms with gunny-sacking covers made for this use. If laid away in a dry room when the fruit has set, such covers will last many years. Friends in Illinois have grown very fine crops by covering frosty nights with light muslin screens Our gardeners know that even lath screens will protect vines and fruits during frosts that blacken all tender plants exposed to direct radiation of heat.

The Fig.—Though not a stone fruit, the fig illustrates the possibilities in the way of laying down tender fruits. During our summers the growth and foliage of the fig are as perfect as in California, and when laid down and covered over winter its fruit ripens with us as perfectly as in South France. Even if the wood

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is frozen under the winter covering of straw and earth, no harm seems to result. In north Iowa figs have been ripened five years in succession, with no more winter covering than is required by the peach.

DISCUSSION.

N. T. CASE: My observation favors the belief that the Chickasaw varieties of the plum are not liable to be attacked by black knot. I have the Maquoketa standing by the side of native varieties covered with knot, but it has always retained its perfection of health and fruitfulness.

C. G. PATTEN: Are the cherry trees budded on wild red cherry (*Prunus Pennsylvanica*) at the college still doing well?

THE SECRETARY: We budded the Yellow Glass, one of the Red Dukes and two Morello varieties on Prunus Pennsylvanica five years ago. The Yellow Glass is a strong-growing, sweet variety, as are the Duke and the Morellos used. At this time there has been no overgrowth of the scion. It is difficult to detect the point of union on account of the even growth of stock and scion. They have borne specimens of fruit the two past seasons when root-grafted trees of this age gave no show of blossoming. The experience in Pennsylvania, Illinois, Wisconsin and Iowa during the past twelve years favor the belief that this is the natural cherry stock for western use. The drawback at present is the scarcity of stocks and of seed for producing them. Yet some seasons thousands of bushels of red wild cherry seed go to waste in Wisconsin.

C. G. PATTEN: Some six years ago I budded Early Richmond on Prunus Pennsylvanica, and while the union is good the trees have not borne well. The stock is now somewhat larger than the Early Richmond top. My experience with Early Richmond trees on their own roots is that they are not nearly as hardy as when budded. Mr. Case has had the same experience. Some cottonwood trees on driest ground, grown from cuttings, are now badly decayed, while older trees grown from seed have stood the drouth much better.

C. L. WATROUS: I had many trees of Early Richmond on their own roots, and after fifteen years' trial I have grubbed them out as cumberers of the ground. It may be an excellent plan to grow cherry trees from root-cuttings, but the time has not been long enough to form a positive opinion,

N. T. CASE: At Des Moines I find the peach root long-lived as a stock if planted a little below the surface to prevent injury from borers. In a plum orchard on plum roots no sprouts appeared between the rows, where the ground was well cultivated; but in the line of row, where no cultivation was given, there were many sprouts.

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J. G. Berryhill offered the following resolution:

Resolved, That the Committee for purchasing and distributing stock for the experiment stations are hereby instructed to prepare a list of satisfactory stocks for top-grafting the tree fruits of Iowa, the growing of which is likely to prove profitable; and that such committee be requested to correspond with growers throughout the State that their experiences may be secured for publication in the forthcoming report.

Resolved, That said committee are instructed to arrange with a grower for the propagation of a suitable number of stocks of varieties which are in their judgment most promising as stocks for use in the various sections of the State, and that each one of the same shall be top-grafted with such varieties as the committee may deem best for the purpose of determining the adaptability of different stocks to the different desirable varieties.

Resolved, That the members of the society are hereby requested to forward such information as they may possess on the subject of top-grafting, to Mr. C. G. Patten, Charles City, at their earliest convenience, that he may collate the same for publication in the forthcoming report.

On motion, the resolution was adopted.

The president displayed some fine specimens of the Oxford apple brought by Mr. Lathrop, and called for an explanation.

H. W. LATHROP: I have not seen the original tree of the Oxford. It is a seedling growing about sixteen miles west of Iowa City. I secured some specimens this year to send to the World's Fair. It is a good bearer of large, handsome, late fall apples, nearly as good in quality as Jonathan.

AFTERNOON SESSION—THIRD DAY.

Session opened at 2:15.

The committee on parks made the following report:

Resolved, 1. That it is the sense of the Iowa Horticultural Society that a uniform law to provide one or more public parks in each incorporated town or city of the State, of not less than .....inhabitants, would add to the health, culture and happines, if not to the pecuniary value of the property of the residents of such incorporated town or city.

Resolved, 2. That further, it takes the liberty to suggest that legislation to carry out such a measure should be well guarded against all probable and even possible abuses; that it should only be attempted by a vote or petition of a majority of the voters or adult citizens of the town or city, the amount not to exceed one per cent upon the assessed valuation in cash or bonds at first, and not over one mill yearly in future, and that in cash; that land can be obtained by donation, purchase or condemnation where adjoining any public park; the park system to be under three commissioners, to be elected by the people to serve without salary, and one to be elected each year, making the term of each three years.

The report of the committee was adopted and referred to the committee on legislation, with instructions to act in accordance with the wishes of the society.

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HORTICULTURE FROM A CLIMATIC STANDPOINT.

BY J. R SAGE, DES MOINES.

Iowa is unquestionably the foremost agricultural state in the Union. It easily distances all other states in the production of corn, and has notable adaptability of soil and climate for the growing of all staple crops. All the elements—heat and cold, sunshine and frost, Arctic winters and tropical summers—contribute their quota to increase the volume of production. The only drawbacks experienced are the results of occasional excess of some of the benign elements which in their normal operation make this region a paradise of abundance.

This society represents a body of men who are striving to make Iowa notable in the line of horticulture as well as agriculture, and it is gratifying to know that a fair measure of success has been achieved. The honors won at the World's fair by the exhibit of Iowa fruits attest the fact that the people of this state are not devoting all their time and energies to the culture of the grosser products of the soil. Iowa horticulture is steadily advancing, and there is promise that in the not distant future the orchards, vineyards and gardens of this State will produce more than enough of the staple fruits for the wants of our own people.

But this is by no means an easy undertaking, for it must be admitted that the climate of Iowa and of the upper Mississippi valley generally, is much better adapted to agriculture than horticulture. It requires a much greater expenditure of gray matter or brain fertilizer, or a higher order of talent, to raise an abundance of fruit than to produce vast quantities of hog and hominy. The farmer scratches the back of old earth with a harrow and cultivator, and an abundant harvest is assured. But the fruit grower must needs contend against many adverse conditions of which the corn grower has no conception. Eternal vigilance is the price of the best fruits of earth, as well as liberty. And despite the exercise of the most intelligent care and vigilance the fruit grower will have many "off years" and suffer many grievous disappointments. All the more honor to those who hold fast and win a fair measure of success in the end.

It were too much, perhaps, to expect a state to possess all the cardinal virtues, and some may contend that we ought to be satisfied to have Iowa stand foremost in agriculture. But we are not content with that alone, and that's what we are here for. We believe, and in fact we know, that Iowa possesses vast undeveloped resources in the line of fruit production. To develop these resources is our duty, and the fact that great obstacles must be overcome adds honor to achievement.

Climate is the prime factor in fruit culture. A poor soil may be improved, but general climatic conditions cannot be materially changed by human agency. The best we can do is to migitate severity and breed plants of sufficient hardiness to

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withstand the extremes incident to our climate. This has been done to some extent in Iowa, and along this line future success must be won.

The climate of Iowa is strictly continental, and this implies that it has cold, dry winters and warm summers, with great seasonal and daily ranges of temperature, a generally dry atmosphere and a large percentage of sunshine. Having no considerable body of water to store up heat and serve as an equalizer of the seasons, it takes a pretty long thermometer to record the extremes of temperature. And this liability to extremes is the one feature of the climate which the fruit-grower must take into account.

In our climatic studies we take note of averages, and do not pay sufficient heed to the extremes which so vitally affect plant life and growth. At many points in Iowa the records show a range of 125 to 130 degrees from the maximum of summer to the minimum of winter, and a monthly range of 50 to 75 degrees. At Des Moines, in the year 1892, the maximum temperature recorded was 95 degrees above, and the minimum 26 degrees below zero. In January of that year the maximum was 50 degrees above, the minimum 26 degrees below—a range of 76 degrees for the month. At Los Angeles, California, the weather bureau records show an annual range of 60 to 70 degrees, the maximum reaching about 90 to 95 degrees, and the minimum seldom going below 30 degrees.

So our Iowa horticulturists must face the fact that their unprotected trees and vines are subjected to below zero temperature a good many days during the winter months. In the northern tier of counties the mean temperature of each month in the year is 8 to 16 degrees lower than at southern points. And in the northern counties 30 degrees below zero is not an uncommon figure in the mid-winter season. Only well ripened and hardy vines and trees can successfully carry their fruit buds through such a low degree of temperature, especially when the air is almost destitute of moisture.

But the variableness of our winter and spring months is the climatic feature which is most trying to plants as well as people. We have occasional warm spells near mid-winter when the bright sunshine and balmy air cause the sap to flow and buds to swell, and the soil is in good condition to plow; then the wind suddenly veers to the north, bringing boreal blasts and zero temperature, more severe in effect because of the sudden change. A steady cold winter is not so damaging as one of the open-and-shut variety.

And as a rule, it may be stated, our winters are not so destructive to fruit buds as the spring months. The last week of March, 1893, was warm and genial, with maximum temperature ranging from 60 to 75 degrees, and the minimum barely reaching the freezing point. The first decade in April gave a mean daily temperature of 53 degrees, the maximum on several days reaching above 80 degrees; the daily mean of the second decade was 44 degrees, with a minimum of 22 degrees, at Des Moines; and the third decade brought a daily mean of 40 degrees, with minimum records from 21 to 26 degrees. The last day of April was colder than the first day, and the average of the last decade was 13 degrees lower than the mean of the first decade. The month came in wrong end foremost.

The first decade in May gave a daily mean at Des Moines of 50 degrees (3 degrees lower than the first decade of April) with a minimum reaching the frost line at many points in the State on the 2d, 3d, 4th and 6th. And there were frequent cold rains with heavy gales during the season of blossoming and pollination. Thousands of spring pigs were destroyed by excessive cold and moisture, and it seems a miracle that any tender buds survived to make an exhibit at the great exposition.

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The springs of 1892 and 1893 were alike unfavorable—twins of a sinister breed. Happily our State is not burdened by a very large family of that sort. Probably more than half our seasons are fairly mild and favorable for the trees and vines that are hardy and well acclimated.

But our horticulturists must run the gauntlet, and take their chances of partial or complete failure from the effects of such adverse weather conditions as were encountered during the last two springs. And the problem to be solved is how to produce a fair crop of fruit despite these drawbacks and adversities. In my opinion this can only be accomplished by breeding hardiness and by retarding blossoming to as late a date as possible. The law of heredity is as helpful to the horticulturist as to the stock-breeder, and the qualities of hardiness and lateness of putting forth blossoms and leaves may be developed by careful breeding. And to a limited extent, at least, judicious location and protection from the too fervent heat of early spring may serve to delay blossoming till the time of danger is past.

The difference of eight to ten degrees in the daily mean temperatures of the southern and northern tiers of counties makes a very marked difference in the development of fruit buds and blossoms, the blossoms appearing from eight to twelve days earlier in the southern districts. But the occasional blizzardy northers which sweep over the State in April and May are well nigh as severe in the southern as in the northern districts, and the effects are, therefore, more damaging. That accounts for the fact that in the last two seasons the apple crop scored a higher percentage in the northern than in the southern half of the State. The fruit growers of the north have been compelled to make more careful selections as to hardiness and other qualities of adaptation to their climate, and their trees are more careful of their tender buds in early spring.

Captain Speer tells us that many fruit trees have been killed by the sudden thawing of their roots early in April. This would seem to indicate the necessity of mulching after freezing, or other method of holding the frost in the ground to as late a date as possible. And it would also prove the wisdom of the selection of northern slopes for orchards, especially in the northern districts. With the requisite quality of hardiness and ripeness, our apple trees can withstand any degree of below zero temperature incident to our climate; but even the most hardy will yield to the solicitations of the fervent heat and powerful solar rays of early spring, and put forth bud and blossom before the reign of summer is well established. That is one of the greatest drawbacks encountered by our orchardists, and it can not be remedied by breeding. It may be mitigated by care in the location of fruit trees, and by artificially retarding too early development.

In my opinion our horticulturist would do well to hedge against this difficulty. In other words, they should plant evergreen hedges and dense timber belts, whenever it is practicable, at the highest point south or southwest of their orchards and fruit gardens. This should be done for the double purpose of retarding premature development in spring and tempering the hot, scorching winds of summer. This will not remedy the whole trouble, but it will do much by way of mitigation. If a man has but a limited acreage to devote to fruit he will do well and obtain better returns if he will plant one-tenth (or better one-fifth) of his ground in dense timber for shelter.

In this region we have a very large percentage of sunshine, and this subjects fruit trees to the serious effect known as sun-scald. The most serious damage is caused generally in early spring, before the foliage has started. In April it is not uncommon to have a number of very bright days, with a maximum temperature ranging along in the eighties. There is a tremendous force in the direct solar rays

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at that season of the year, and trees that have successfully weathered the blizzards and extreme cold of winter may succumb to the powerful effect of untempered sunshine. It would seem that by the exercise of care and ingenuity this trouble may be wholly avoided. It certainly is worth while to discuss the question and to devise means to that end.

In the southern central districts of the State, and to a limited extent in the northern districts, we have occasional blasts of hot winds—fiery blizzards from the southwestern plains—the temperature ranging near the top of the nineties, and the wind blowing at a velocity of twenty-five to thirty miles an hour. These winds are often exceedingly dry as well as hot, the percentage of humidity ranging from 35° to 40°. The following figures from the records of the central station will serve as samples:

DATE—1890.	Maximum temperature	WIND.		Humidity—per cent.
		Velocity—miles.	Direction.	
July 6	101	27	sw	35
July 7	101	25	sw	36
July 13	101	13	sw	37
July 28	91	28	sw	44
July 29	93	30	sw	44
July 30	96	38	sw	35

During July and August, 1890, there were ten days of similar weather. Three consecutive days of that sort of hot blasts will pretty nearly cook your gooseberries and other garden sauce. Our fruit growers, as well as corn growers, know something of the effects of these occasional visitations of simoons from the Great American desert. It should be stated here that they are not indigenous in Iowa, but are somewhat rare exotics, imported from the southwest. About two years in five we are liable to have these scorchers, of more or less severity.

When they come in full force and fervency, early in the season, small fruits are seriously injured, and the orchard fruits are considerably damaged.

The best we can do is to mitigate their severity by conserving moisture, so far as possible, by means of mulch and wind-break. A dense grove at the southwest, located on high ground, will afford a very large measure of protection to the fruit garden and orchard. And in time of extreme drouth the great value of tile drainage will be attested. In fact, it can be demonstrated that tiles, properly placed, are as valuable in a dry season as a wet one.

In Iowa we have, on the average, 140 days between the killing frosts of spring and autumn. This gives ample time, other conditions being favorable, for the growth and complete ripening of our vast corn crop, and for the trees and vines adapted to this region. But it sometimes happens that growth is checked in spring or early summer, and then by warmth and moisture late in August a new growth is started and continued till the season of frosts. Under such conditions winter-killing of the immature shoots and buds is an inevitable result. There is no way to remedy this, except by breeding varieties that have an established habit of early ripening. And this habit may be fostered by due care.

In Iowa the bulk of our rainfall comes in the spring and summer months when most needed. Our autumns are proverbially mild and dry, and in winter we have bare ground most of the time from December to March. We cannot count on much protection for vines and trees afforded by heavy snows, so the necessary protection must be afforded by other means.

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The heavy rainstorms which sometimes occur in the season of blossoms when accompanied by hard gales and followed by chilly weather, seriously interfere with pollination and greatly lessen the fruit crop. Probably the shortage in the fruit crop of '92 and '93 was largely the result of imperfect pollination, from the effects of the excessive dampness, heavy downpours and strong gales. Fortunately such seasons are exceptional in Iowa.

In closing this somewhat lengthy paper, it is a pleasure to say that despite all the drawbacks enumerated, Iowa horticulture is steadily progressing, and for this great credit is due to the brainy and plucky members of our State and district horticultural societies.

In my opinion forestry is the chief hand-maiden of both horticulture and agriculture. If we had begun early and planted wisely, covering one-fifth or even one-fourth of our area with nut-bearing or other useful timber, we should now be able to raise much greater crops of corn and fruit on a much lessened acreage. We have now less than 200,000 acres of artificial groves, and about 2,000,000 acres in natural groves. The natural groves serve a good purpose and should be carefully preserved; but these are so located that they afford small protection to the vast regions of upland prairie. We should have at least 5,000,000 acres in planted timber, and our State will never attain its best in fruit and staple crops until we provide these great conservators of moisture and barriers against severe wind storms.

With great timber belts, judiciously located, and by the construction of artificial ponds and lakes, we may in time be well nigh exempt from damage by hot winds and drouths, and we may even ward off a large measure of danger from tornadoes.

We are compelled to dig or bore deeper wells to strike our constantly receding water level. Our annual rainfall holds up the average of fifty years, but the water level is constantly being lowered. We must be less prodigal of our moisture, retaining as much of it as possible by artificial forests and ponds. By this means we may make Iowa literally the garden of America, and not merely an immense cornfield.

HORTICULTURE FROM A CLIMATIC STANDPOINT.

BY H. W. LATHROP, IOWA CITY.

In fruit growing there are three prime factors to be taken into consideration—soil, cultivation and climate. The first of these can be altered and changed in certain particulars by the addition of fertilizers, by irrigation, and by intelligent and thorough, or ignorant and inefficient manipulation. The second, cultivation, may in like manner be careful, intelligent and painstaking, or it may be careless, ignorant and slipshod. But the third factor, climate, we must take and use as we find it. It is governed by fixed laws which we can neither amend, revise nor repeal; and as we are subject to those laws, we of necessity are forced to study them and be governed by them.

The main elements of climate are light, heat, humidity, aridity and air. How much our climate is affected by that subtle, imponderable agent known as

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electricity, few, if any of us know. Ours is a continental climate, unaffected by any great bodies of water, or ranges of mountains; subject to great extremes of heat and cold, the mercury in Fahrenheit's thermometer ranging from minus thirty to plus one hundred, hence all our fruit-bearing plants, shrubs and trees, that cannot in some way be protected, must be capable of enduring for a short time at least these great extremes of temperature, for there is scarcely a decade in which we do not have to encounter them both. They, too, must go through years in which the precipitation of moisture is sometimes less than two feet, and sometimes more than six feet.

Not being able to adapt our climate to our fruits, the most perplexing problem of the horticulturist is the adaptation of fruits to the climate. Our fruits and the climate must be able to lie down and get up together; they must be able to summer and winter together; for a fruit that meets and gets into a contest with, and has to succumb to, an unfriendly and ungenerous climate, can never be a profitable one to its propagator.

That the climatic conditions of Iowa are adverse to fruit-growing, the experience of half a century disproves. Yet who of us has succeeded in producing even fair crops of the delicious pear, the luscious peach, the sweet cherries, the flavor-producing quince, or the palate-pleasing plums known to the elder members of our society? Still our fathers and grandfathers before us on our lines of latitude in the older States have raised them in perfection. They have all been raised here, but so feebly that their production may be classed as the barely possible of impossibilities.

The two methods of meeting and overcoming these difficulties are the introduction of desirable fruits from other countries having like climatic conditions to our own, and the breeding and propagating upon our own grounds of fruits of good quality, adapted to their environments. Success may ultimately be obtained by both methods. A few generations of peaches grown here will undoubtedly give us a variety adapted to our climatic variations, and this is now almost if not quite an established fact; and I see no reason why the same results may not be reached with the pear and other fruits.

While such choice grapes as the Delaware, Iona and Prentiss succumb to the mildews of our locality, and fail to ripen their fruit, it is quite probable that their descendants and their crosses with other varieties, would be equal in hardiness to the old established and long tried Concord. Indeed, we have with the grape nearly if not quite reached that point, if not in this direct line.

Of the fruits growing in and in proximity to countries along the fortieth parallel of north latitude, those that can be raised in Iowa grow in their greatest perfection. Apples here attain their largest size, take on their brightest colors, and develop their best blooms, and the same may be said of all the small fruits native here.

The greatest severities we have to encounter here are when our trees go into winter quarters with the soil in need of moisture, the surface of the earth bare of snow, and Old Boreas blowing his icy breath over us at a temperature of 20 to 30 degrees below zero, and at a rate of 20 to 30 miles per hour.

Is our climate changing, and if so I would ask in what respect? It seems to me that our winds do not blow with their old-time velocity, but a more than forty-five years' acquaintance with their familiarities has made me accustomed to them, and may have made their frisky pranks less observable. The hot southwest winds of spring have lost the force and reduced the temperature they had a generation ago.

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The human system is an organism quite as sensitive to the changes of our climate as any of our plants, and the absence of the dreaded fever and ague and allied diseases now, compared with their frequency and persistency in attacking our early settlers, indicates a change. But the question recurs—what change? Is it climate or diet? The volume of water discharged by our streams would seem to indicate that our rainfall is decreasing, but this decrease in the volume of our rivers may be attributable to other causes.

Had I the data at hand, I would like to note fully the eccentricities of our climate during the last half century. Without that data I will note a few of them. Commencing with 1837, during the following thirty-five years every seventh summer was a very wet one. The winter of 1843 commenced very early, was very severe and continued very late, the rivers being bridged with ice on which teams could cross till well into the month of April. The winters of 1856-7 and 1857-8 were so severe that nearly all of our orchard and nursery trees were killed. On the 25th of March, 1857, Major Williams left Fort Dodge for Spirt Lake with a battalion of one hundred men to punish the Indians for the massacre they committed there, and on his return in April, fourteen of his men were badly frozen, and two of them were frozen to death, and he reported having gone through snow drifts that were fifteen and twenty feet deep. On the 13th of October 1869, the earth was frozen to the depth of six inches, and all unharvested apples were completely ruined. The winter of 1872-3 was a freezing one to the hopes of the horticulturist, and the volume of our reports for that year, detailing the injuries inflicted, may be called our "Book of Lamentations." Winter set in that year on the 13th of November, and the mercury went below zero two days in that month. In December it was below zero ten days, at one time 28° below. In January it was below zero thirteen days, on one of them going down to 27° below. In February it was below on six days.

I might call to mind some of our wet seasons, when the rains deluged our vineyards, nurseries and orchards, took the bridges from our streams and filled our rivers so overflowingly full, that steamboats from St. Louis made their way over some of our now well-tilled fields, and in one instance landed on a spot that is now used by the students of one of our colleges as a field and ball park for their athletic sports; but I forbear, as my paper is already too long.

Prof. L. H. Pammel offered the following:

WHEREAS, The subject of forestry is of such great and paramount importance to the agriculture and horticulture of this country, be it

Resolved, That this society urge our national representatives to assist in the passage of such laws as will adequately protect the forest reservations heretofore set aside.

On motion, the resolution was adopted.

DISCUSSION.

J. M. ELDER: I have observed no retarding of the period of blossoming by mulching fruit trees.

JOHN WRAGG: That has been exactly my experience.

THE SECRETARY: The experiments recently made by Prof. L. H. Bailey, of the Cornell University Experiment Station, Geneva, New York, show that mulching does not delay in the least the period of

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blossoming of fruit or other trees. The early growth is from the stored nutriment in the top, and is largely independent of root action. On the other hand, mulching strawberries retarded growth and blossoming for the reason that the top, as well as the roots, was kept cool.

J. M. ELDER: Shelter belts and groves of forest trees should not be planted nearer than twenty-five rods from the house. They take all the moisture from the ground and interfere with the growth of other plants.

JOHN WRAGG: Prof. Bailey's experiments were conducted in New York, where growth begins very much sooner after the snow is gone than here. A number of years ago I experimented with four trees of the Fameuse apple. The ground was deeply covered with snow, and by pouring on water this was soon changed to ice. A heavy mulching of manure was then applied on top of the ice. But not the least retarding in time of blossoming was observed.

J. R. SAGE: Any sudden thawing of the roots is very injurious; hence mulching may be beneficial on this account.

W. H. GUILFORD: It is a very popular error to suppose that mulching of fruit trees retards early blooming. I had a very large plant of the Prairie Queen climbing rose, growing up to the second story windows. Some of the branches were permitted to enter through a window, and they bloomed as finely at Christmas as the other branches did in June.

R. P. SPEER: Others have had a similar experience with grape vines.

ELMER REEVES: I have read of similar experiments in the reports of the American Pomological Society. Although the roots of trees may be frozen solid in the earth, yet it will not prevent growth of top when the air becomes of the proper temperature.

THE SECRETARY: Mr. Geo. P. Peffer, of Wisconsin, said a number of years ago that he believed mulching would retard blossoming. After a very dry season, winter set in and the ground froze deeply. This was followed by a deep snow. The trees were then mulched heavily. In the spring they leaved out rapidly and grew well for a time, but in a short time they all died. The roots in the very dry soil underneath could not supply the loss of water by evaporation. At one time I drew a branch of a Concord grape vine in through a greenhouse window. It grew and blossomed, while the roots outside were still frozen.

The resolutions passed at the forenoon session concerning the relations between C. L. Watrous and the Iowa Columbian Commission,

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were now taken up for re-consideration. After discussion, they were on motion referred to the Board of Directors for final action.

G. B. Brackett gave an interesting account of horticulture at the World's Fair, to be embodied in a paper later on.

THE FRUIT-TREE BORER.

BY W. H. GUILFORD, DUBUQUE.

In the early settlement of northeast Iowa the Black Locust was extensively planted in exposed locations, and particularly around orchards. The period of its vigor and health is only a few years, usually about twenty, when it becomes decayed, and is more infested with borers than any tree I know of. The next best harbor for borers is the Black Oak, which, under existing conditions, is also a short-lived tree, and during its period of decay and death the borer takes full possession. I do not know of any of our native timber that is entirely exempt after it becomes diseased. Yet I do not find the fruit trees in the vicinity of those borer-infested trees any more seriously affected than those at a distance. This may be accounted for from the fact that the beetle flies over large areas of territory while mating and before the eggs are deposited.

There are undoubtedly several distinct species of the family. The large, flat headed borer of the oaks is not identical with the small one that we find in young plum and cherry and some of our forest seedlings. In many years of handling and growing nursery stock I find more borers in imported seedlings than in those of home growth.

Some ten years ago I imported from France a few thousand two-year-old lindens, covering three varieties, and all were badly affected, yet they made a fair growth, and the year following I could not find any trace of borers. Whether they passed from the pupa stage and winged their way out to breed again, or perished in our Iowa blizzards, I cannot say, but I am satisfied that this particular species found in the lindens will effect lodgment in a sound healthy plant. Those seedlings had not been transplanted and they were all smooth and in healthy condition. As to the borer of our orchard trees and those of the forest, I am of the opinion that they do not make successful lodgments in sound healthy trees.

When we see the nut-hatch creepers and woodpeckers devoting their time and attention to any particular tree of the orchard, we may conclude that the period of that tree's usefulness is about over.

Not long since I had an opportunity of noticing the work of a little gray woodpecker. I found him early in June working on a large Rawle's Genet. He commenced on the northwest side, immediately below the first limbs. In about twenty seconds he would make a puncture through to the cambium layer, then make a side hop of about three-quarters of an inch and make another hole. After

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a few days I noticed he had about thirty punctures made with the regularity of a checker-board. Fearing he would destroy the tree, I tied a strip of red flannel to a limb, letting it hang down over the base of his operations. He returned frequently, would take hurried glances at the flannel, and then fly away. After about a month we saw him again, apparently very anxious to get to his traps, but every time the flannel moved he was gone. Upon close examination I found five of the holes contained eggs. We removed the flannel and in less than five minutes he came and cleaned them all out, and tore out the sides of some holes in such a way that I was satisfied that some of the eggs had passed through the period of incubation and the larva had made an entry. The following spring the tree was dead.

The vandals are abroad in the land, the little 22 rifles are dealing death among our useful birds, and probably my little feathered friend went down among other innocents.

But it does not necessarily follow that either the bird or the depositor of the eggs knew that the tree was diseased. But the facts are that the tree being unhealthy, it was nearer the temperature of the surrounding atmosphere than a healthy tree that is kept cool by its regular uninterrupted flow of sap; and, in my judgment the diseased tree is the most congenial to the development of the larvæ even before the tissue has been ripened and sweetened by the process of decomposition. In old orchards of tender varieties the borer is abundant; but with hardy varieties under good cultivation or other favorable conditions, I hear no complaints.

A perfectly hardy variety in its transit from the nursery row to the orchard may receive bad treatment, from which it cannot recover, and become infested with borers on the principle that a sickly or ill-fed animal becomes a victim to its parasites.

DISCUSSION.

H. D. McCoy: I find that nursery trees are very often attacked by borers. If trees are mounded up with earth during the period of egg deposition they will never be injured by borers.

J. S. Harris: I am very sure of having seen the healthiest and soundest of trees attacked by borers, although old, unthrifty trees are more subject to their attacks. In Minnesota the sap-sucker injures evergreen wind-breaks by making a line of holes all around the stem, often causing the tree to break off. During the breeding season the bird visits the tree to drink the sap and eat the inner bark. If fruit trees are banked with earth in the spring and until after the eggs are deposited in June, no trouble will be experienced from borers. These beetles prefer to work in daylight. I do not think mulching aids the flat headed borer in its work, although it aids many other insects.

J. M. Elder: The bird referred to, the sap-sucker, is the speckled woodpecker of the books on ornithology.

CO-OPERATION IN MARKETING FRUITS.

Ben McCoy: I have had no practical experience in co-operative handling and marketing of fruits, but know from the experience of

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others that lack of system in marketing is very unprofitable. We should learn a lesson from the strength of a bundle of sticks. The producer must learn that he is not done with the transaction when he gets the money of his customers. Honest, careful grading and packing is essential to success. The home market is easily glutted. Producers hasten to the nearest market; it is soon flooded, and prices fall. By co-operation the surplus could be promptly shipped at car-load rates to distant markets, and fair prices retained. I fear no overproduction. The fruit growing section is small as compared with the fruit consuming sections. Much time can be saved by co-operation, as one man could easily handle the crop of a township. The abuses of the commission system can largely be remedied by proper co-operation among fruit growers.

On motion, the committee on the preparation of a list of common and scientific names of trees and shrubs, was continued for the ensuing year to give time for the preparation of an exhaustive list.

The preparation of a fruit list on a scale of points by a committee consisting of members from the State Society and the four district societies on the plan outlined by R. P. Speer, was discussed. On motion, the matter was referred to the board of directors with power to appoint such a committee.

J. S. HARRIS, delegate from Minnesota: I have been much pleased with the many able papers presented as this meeting. Our Minnesota fruit growers wish to be on neighborly terms with those in Iowa. We are thankful for the many valuable varieties received from Iowa through Prof. Budd. The history of fruit culture in Minnesota is one of many reverses, as well as much encouragement. In 1856 I came to Houston county, Minnesota; a little later I made an exhibit of fruit at the state fair. In 1872 there was a wonderful display from various parts of the state. Orchards were very promising, but they were killed by the winter of 1872–3. This was a terrible blow to the fruit interests of the state, and many determined never to replant. However, orchards were again planted. Then again in the winter of 1884–5 came widespread disaster to our orchards, which spread to states far east of us. We recovered from the general devastation, and last year we were proud of the fact that Minnesota apples were shipped by the car-load to Missouri, Iowa, the Dakotas, and other states, and one car-load even went to Michigan. The Siberian crabs did a good work in encouraging people to plant better varieties, but they brought blight and abundance of fruit for which there is no market. Minnesota has been overrun by unreliable tree peddlers, who deceived planters in many ways, and much worthless stock has been planted in consequence. The State Horticultural

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Societies of Minnesota and Iowa are doing much good, but their published experience should be more widely disseminated among the people. It is a law of pomology that few varieties are adapted to a large number of localities, hence each section must, to a certain extent, develop its own list of fruits by the production of seedlings. I have always held that there is something in the soil, sunshine, winds and other environments, that tends to produce in a seedling a tree better adapted to its particular locality. We should start with the hardiest varieties, as the Russians in the case of the apple. Let us go on then with faith in our work and do our duty to a man, and we will soon have the prairies of the northwest recognized as one of the very best fruit sections of the country.

EVENING SESSION—THIRD DAY.

Session opened at 7:30.

THE BLOSSOMS OF THE ORCHARD FRUITS.

BY PROF. N. E. HANSEN, AMES.

This subject is one of great importance to the practical fruit-grower. A careful study of the blossoms will often explain why fruit trees, vigorous and of bearing age, fail to produce satisfactory crops. Many varietes are infertile with their own pollen, and bear fruit only when near other varities blooming at the same time. Large orchards of one variety are often unfruitful, owing largely to the variety being infertile with its own pollen, and partly to the lack of free air circulation which favors better distribution of pollen.

Plum growers long ago learned by experience that block orchards of certain varieties were not profitable, and that it was necessary to plant other varieties adjacent in order to insure regular crops, Strawberry growers have also learned that it is best not to plant even the perfect flowered varieties alone. There are instances of dewberries bearing no fruit until blackberries were planted near by. Grape growers have discovered that many of the choicest hybrid grapes are imperfect in pollen, and fruit satisfactorily only when planted adjacent to other varieties, such as Concord, with an abundant supply of pollen. (In the woods we find

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the fertilization of the grape ensured by a large proportion of vines bearing only staminate blossoms.)

But we have been slow to recognize the fact that to a greater or less extent the same is true of the apple, pear, cherry and other fruits. The great advantage of keeping bees on a fruit farm is well known. But the work of the bees is much more efficient if several varieties of the same species are planted than if the bees must confine their work to a single variety.

To determine the cause of this is a difficult if not impossible matter. The characteristics of wild plants are the result of certain fixed conditions acting through many generations. Truly "a survival of the fittest." This has resulted in a fixity of type not found in plants that have long been under the care of man. Cultivated plants are an artificial product; there is often lack of balance between reproductive and vegetable forces, and undesirable characteristics often appear. Plants of recent cultivation have been removed from their old habitats, to which they were fully adapted, and exposed to other often widely different conditions. If any undesirable tendencies or characteristics appear as a result of changed conditions, they are perpetuated by budding, grafting or division, as these are merely methods of segmentation or subdivision of the same individual.

PLUMS.

Fruit-growers have met with a difficulty in the successful cultivation of the native plum in the fact that some varieties are self-sterile, that is, they do not fertilize themselves. Isolated trees and large orchards of Wild Goose and Miner have proven shy bearers, while when planted intermingled with other varieties blooming at the same time and furnishing an abundance of pollen, they have borne heavy crops. Hence, it is important to determine the most suitable list of varieties for an orchard so as to ensure the most perfect pollination of all the blossoms. Newman is considered a good pollenizer for Wild Goose, while De Soto, Wolf and Forest Garden are regarded as good fertilizers for Miner. Isolated trees of the self-sterile varieties may be made fruitful by top-grafting some of the limbs with suitable varieties, or by planting trees of these sorts adjacent. Mixed planting of self-fertile and impotent varieties in hedge-like rows or in alternate rows is now advocated and practiced by our best growers. Some growers, however, prefer to confine their choice of varieties to those that are self-fertile. But it is an open question whether it is not best to plant even such strongly polliniferous varieties as De Soto and Wolf intermingled with other varieties. By close planting the branches soon interlock, and the conditions are favorable for perfect pollination. I have seen heavy crops produced by such clusters and thickets of plums. The shading of the ground by the close planting is said by some to make the conditions unfavorable for the development of the curculio. But the close planting may be overdone so as to make the plum orchard an impenetrable thicket. Ten feet apart in the row, and the rows twenty-five feet apart, with the rows running north and south, has been found a good distance by many Iowa growers. This method permits free circulation of air which aids in fertilization.

In crossing native plum blossoms I have found that some varieties have many flowers with imperfect pistils. Last spring a large proportion of Rollingstone had very short pistils so that it was difficult to apply pollen satisfactorily with a camel's hair brush.

The crop of fruit was lighter than on adjacent trees of Wolf in which very few flowers with imperfect pistils were observed. Prof. L. H. Pammel has made many

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observations in this line for several years* and finds that De Soto, Rollingstone and Pottawattamie bear many flowers with imperfect pistils. Especially was this the case with Rollingstone, the pistil being entirely absent in many cases.

Prof. L. H. Bailey mentions a tree of *Prunus Americana*, which bears flowers without pistils and mentions the imperfect pistils of many wild plum blossoms. He believes they are apparently peculiarities of individual trees or particular seasons. Thus, in the Newman plums on the Cornell University grounds in 1892, only about every twelfth flower had a perfect pistil. There is a good field here for a series of experiments.

Last spring I put from five to twelve muslin sacks over fruiting spurs, each containing many blossoms, of each of the following varieties: Ogon, Hunt, Wolf, Cheney, De Soto, Moldavka. The sacks were securely fastened with wire, and were put on before any of the blossoms had opened, and were not removed until fruit had begun to form. In De Soto, Hunt, Wolf, and Moldavka nearly all the flowers set fruit; in Cheney and Ogon very few. But none of the plums matured. The experiment will be repeated.

The past two years I have made a series of observations on the time of blooming of plums and cherries which I will report in due time. Several varieties of east European plums growing on the college grounds at Ames were observed to be strongly proterogynous; that is, the pistils were ripe before the stamens. The pistil would in many cases protrude from one-fourth to one-half an inch beyond the petals while the flower was yet in bud. This favors cross-fertilization, as the pistil would be pollinated before the flower expanded to permit the escape of pollen from the anthers. I observed this in the case of Early Red, Black Prune, Moldavka, White Nicholas and other east European plums.

Proterogyny was also observed in the case of a Chinese snow pear (No. 1405). The pistils were erect and diverging and the stigmas receptive, while the stamens were still curled up in the bottom of the calyx.

PEARS AND APPLES.

In recent years the question has attracted the attention of eastern fruit-growers. In a certain orchard in Virginia some trees of the Bartlett pear, growing adjacent to other varieties, were found to bear heavy crops. This led a stock company to plant 20,000 Bartlett trees in a single block near by. But this orchard never bore satisfactory crops except on a few trees adjacent to other varieties. This led to a series of experiments last year by Prof. M. B. Waite, of the United States Department of Agriculture, to determine the efficiency of pollen of fruit trees on pistils of the same or different varieties. Blossoms were covered before opening with paper sacks, and remained covered until after the close of the period of blossoming. Other flowers were also covered with paper sacks, but pollen was applied from other flowers on the same tree, or from trees of the same variety near by, or from other varieties. It was found that a large number of varieties of apples and pears were nearly or wholly sterile when fertilized only by pollen of the same variety. Among self-sterile varieties of pears were Bartlett, Anjou, Clairgeau, Mt. Vernon, Lawrence, Howell, Clapp's Favorite and Sheldon. Among self-fertile varieties were Le Conte, Kieffer, Doyenne, Buffum, Seckel and Flemish Beauty. The cross-fertilized pears were superior in size to the self-fertilized. Drawings illustrating this were on exhibition at the World's Fair.

Among self-sterile apples were Tallman Sweet, Spitzenburg, Northern Spy,

*Notes on the Pollination of plums, by L. H. Pammel, Science, June 16, 1893, p. 331.

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Chenango and Bellflower. Baldwin and Codlin were among the self-fertile varieties.

These experiments are very valuable. In the west, block orchards of Willow Twig and Jonathan have been found unproductive. The question is much complicated by the effect of varied soils and stocks. Some varieties, such as Oldenburg and Ben Davis, appear to bear well in large blocks.

In the spring of 1890 I was engaged by this society to visit the grounds of Mr. B. A. Mathews, of Knoxville, Iowa, to hybridize a large fruited wild crab with the cultivated apple. Mr. Mathews is a successful fruit-grower of over forty years' experience. He showed me a block of about one hundred and twenty-five large, thrifty Jonathan trees that had not borne except on ouside rows. In reply to an inquiry, Mr. Mathews writes:

KNOXVILLE, IOWA, November 16, 1893.

Prof. N. E. Hansen: DEAR SIR—Yours of the 5th inst. is before me. The block of Jonathan planted over twenty years ago is still here in good shape, but has not borne, except during two seasons on outside rows adjacent to other sorts.

With me this sort, as well as Winesap, does but little good alone. Yet when planted within three or four feet of each other, both bear heavily almost every year. Malden's Blush standing alone bears regularly and abundantly. Again, some of our most productive kinds, whether fertilized or not, absolutely refuse to bear on the Doucain stock.

Some pears, like Kieffer and Mt. Vernon, yield well when by themselves, but Buerre d' Anjou and Angouleme produce nothing under such circumstances. Bartlett is much like the latter sort, though I have had it bear well when comparatively isolated, but on thorn stock. So the matter of stocks in this connection should not be ignored.

Such plums as Robinson, Peach Leaf and Wolf fertilize themselves quite satisfactorily, but with most sorts the reverse is the case.

This summer I raised over one hundred and forty bushels of plums; ninety bushels of these being Wild Goose. All of the last mentioned variety being grown on highest ground and on trees thoroughly fertilized by other kinds.

During an exceptionally good season I have known the Wild Goose to bear well in large blocks, but this rarely happens unless, of course, fertilizers are grafted into the limbs of the trees. I find Robinson and Miner useful for thus grafting the Wild Goose.

Very truly yours,

B. A. MATHEWS.

Mr. Mathews also has another block of thirty Jonathan, top-worked on Tetofsky, which has two or three trees of other sorts scattered through it, and is closely surrounded by other varieties. This block has borne quite well.

In conclusion we may repeat that in the blossoms of the orchard fruits we have a very wide field for observation and experimentation. The writer respectfully requests communications on the subject from fruit growers, detailing their experience, with a view to making further reports to this society.

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GRAPE CULTURE IN NORTHERN IOWA.

BY G. A. IVINS, IOWA FALLS.

Far back in history we read in an old chronicle entitled "The discovery of America in the tenth century," the following legend: A vessel sailed from the coast of Normandy on a voyage of exploration, and was caught in a violent storm which lasted many days, and this frail vessel was drifted along at the mercy of wind and waves, until, at last they beheld this delightful country, which was a forest of beautiful trees. This little crew could not resist the temptation, but went ashore and explored the new world; and they returned laden with grapes; they then named this country Vineland.

Whether this be a tradition or a fact, is of little consequence. The fact still remains, that grapes are a natural production of this country. Is it not the foreshadowing of the destiny of this great continent, to become in truth a vast vineyard? Truly, the results of to-day would certainly justify us in the assertion, that there is as much, nay, more, truth than fiction in it. While we feel a little elated over the progress we have made in grape culture, haven't we to some extent overlooked the importance of growing varieties which can be kept and sold late in the season? If we cannot grow the Catawba in Iowa, we have varieties that we can grow, which are equally as good, if not better. It seems to me that a grape we can sell this time of the year will be as much profit to the grower, as many others that he may grow. When we look at grape growing from a commercial standpoint, we see the day is not far distant, when with our rich soil of the west we will rival our eastern friends. But before this can be accomplished, we must have better cultivation, and more skillful and experienced men. We are to-day reaping an income, the results of enthusiastic horticulturists, who have devoted their lives to nursing the tender plants from germination to maturity. I trust these benefactors may long be remembered for their noble work. From observation I am inclined to believe that fruit growers will soon realize that the retailing of their fruits will give better results by opening a fruit store, wherever the town is large enough to fully justify them in doing so. Then to increase the demand for grapes, we should have the best varieties of black, red and white on the market, so customers can make their own selections. Choice fruits will generally sell for a good price, while poor fruit is a drug on the market, and a detriment to the grower. For commercial trade, those which have been most successful with me, are Moore's Early, Worden, Barry (Roger's No. 43), and Janesville. Among the white grapes, Moore's Diamond and Niagara have given the best results. The Niagara is a strong grower, and bears very large compact bunches, has a flavor many people prefer, but in season not as early as the Diamond. The Diamond is a much better grape than it has had credit for. It is very productive, and bears the largest bunches of any grape I have ever grown.

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Among the red grapes, the Delaware and Gaertner (Roger's No. 14) are two of the best. Should I add another one, I would name the Vergennes by all means; whenever it ripens its fruit in season it is a magnificent grape, and will keep nicely until midwinter. I would not claim by any means that these are the only grapes to grow, for many of us differ as to the merits of certain kinds. In northern Iowa, care should be taken not to plant any variety that is liable to be caught by frost. When the grapes begin to ripen, do not be in a rush and try to out-do your neighbors by placing your grapes on the market first, before they are fully ripe; partly ripened fruit will only be a detriment to the fruit trade; wait until your grapes are perfectly ripe, then exercise the greatest care in picking and packing, so as to have them nice and attractive. I have been requested by a member of this society to explain in this paper how I grew the fine bunches sent to the World's Fair. I do not know that I have a different method of growing grapes from grape-growers in general. Many years ago I adopted the method of growing new canes every year or so to take the place of the old ones, which are always very inconvenient to lay down and cover. I have not a vine in my vineyard on which the canes are more than four years old, while some of these have been planted over twenty years, and from these I got part of the specimens sent to the World's Fair. My vines are planted six and seven feet apart in the row, and the trellis is five feet high. I believe by keeping the vines every year under proper control, and growing the fruit on younger canes, they will produce larger bunches than otherwise. This and the cultivation I give them, is my plan for growing grapes. The fall work in a vineyard should never be neglected, but as soon as frost kills the leaves, begin to prune, lay down and cover with earth. This I consider very essential to success in grape culture in the northwest. The summer work should not be overlooked, but go over the vines several times, thinning out all unnecessary shoots, and cutting others back. While this work is being done, do not forget to cultivate them, and do it many times in the season. Keep fighting the weeds when *very small*, never allowing them to form roots. Continue this process until the last seed has germinated. Then fruit growing will not be such a hardship as many people imagine.

DISCUSSION.

J. S. HARRIS: In Minnesota we find the Brighton to be one of our choicest varieties. Grape growers should agree not to market grapes until well ripened and sweet. But not being organized the growers fear a glut and begin to market the fruit when it first begins to color. This injures the market for the better fruit later on. Proper organization would enable them to realize better prices.

G. A. IVINS: Salem is a fine keeper. Barry (Rogers' No. 43) is larger than Concord, and is a very choice black grape. Agawam (Rogers' No. 15) grows too loose bunches, as is the case with many of Rogers' hybrids. Wilder (Rogers' No. 4) is a good black variety.

R. D. MCGEEHON: I regard the Agawam as one of the best varieties for home use.

A. F. COLLMAN: Careful grading and packing is essential to success in marketing fruits. One year I raised over four hundred bushels of cherries. They were all marketed at Creston and Prescott. Only

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perfect fruit was marketed, and all leaves and loose stems picked. The price realized was much higher than that received by growers who did not sort their fuit. The great need of good packing was fully shown at the World's Fair, especially with grapes. Some baskets of grapes were received in such poor condition that they could not be given away, while others came in perfect condition.

G. A. IVINS: In reply to an inquiry, I wish to state that I do not recommend planting grape vines or anything else in the fall. Our climate is not at all favorable to fall planting. Grape vines should be planted deep, not less than eight or ten inches, and some of the top covered when planted, so as to secure the growth of many new canes. By keeping the canes young and small, not over four years old, they are very easy to cover with earth for winter protection.

A. F. COLLMAN: I would like to hear Mr. Wilson tell how he packed the grapes sent to the World's Fair in such perfect condition.

SILAS WILSON: I first lined the bottom of the basket with leaves of the variety packed, then began in one corner and placed leaves against the sides, then a bunch of grapes stem end down, then a leaf against the side of the bunch, followed by another bunch, and so on until the bottom was covered with bunches snugly packed and separated from each other by leaves. This first layer was then covered with leaves, and the second layer packed in the same manner, and so on until the basket was filled. A few leaves were placed on top and the cover pressed down tight enough to prevent shaking about and bruising.

M. A. THAYER: How do you pack grapes for market?

SILAS WILSON: I find it difficult to get men who will pick grapes with sufficient care, and find a great difference in men in this respect. They pick by holding the cluster in one hand and pocket knife in the other. The grapes should be wilted from three hours to half a day in a current of air in the shade; this wilts and toughens the skin, and the bunches can be packed closer. Some were taken out of the baskets and placed on boards in the shade under some trees, and some were left in the baskets. Next year all will be slightly wilted before packing. I shipped largely to distant markets, and my customers reported arrival in good condition. The placing of grapes in the basket is a difficult matter, and I find it necessary to put my best men at it. Ten-pound baskets are used, the basket weighing one pound.

M. A. THAYER: How do you keep grapes?

SILAS WILSON: I have kept such varieties as Agawam and Delaware in good condition three weeks. The Delaware I have kept very well till Christmas. They are packed in baskets in the same manner as those sent to the World's Fair, the lid is put on, and the baskets

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hung up in the cellar. The leaves seem to retain the needed moisture, and the fruit retains its natural bloom.

H. W. LATHROP: How do you like the Dracut Amber?

SILAS WILSON: Dracut Amber is a poor keeper, and the fruit is very foxy and scents the whole cellar. It is only eatable taken direct from vine. The quality is not good, but it is certainly the best grape that grows for jelly. It is very hardy and productive, and I cannot supply the great demand for vines. Moore's Diamond is my best very early grape to eat from the hand. It is as early as Moore's Early, and I place it at the head of early white grapes for family use. The bunches are as large as those of Lady and much longer. Lady is subject to more or less cracking of the berries in most years. Early Victor is the earliest grape I have; it is of good quality but is small in cluster and berry. The Cottage is far superior, but in quality is not quite equal to Moore's Diamond. It is a neglected variety and in season comes in between Moore's Early and Worden; the bunches, however, shell badly when ripe. The Empire State I am raising very successfully, but many of my customers find it very unproductive and unsatisfactory as to hardiness. For its season I regard it as the best in quality. The season is about that of Agawam, which is a little earlier than Concord. The stem of Empire State is very characteristic; it is precisely like that of Ives' Seedling, in that it is much larger between the severed end and the point where the berries begin. Eaton I have fruited two years. It is large, but very sour and juicy and the skin is tender; it does not appear worthy of being added to the list. Moyer is deficient in foliage. This variety evidently has foreign blood in it, and the leaf is not adapted to our climate.

W. H. GUILFORD: At Dubuque the prevailing opinion is that Worden is not a good shipper.

SILAS WILSON: I do not regard Worden as a first-class shipper. The clusters are very large when well grown, and the skin is more tender than any other Concord seedling. For shipping it is not as good as Moore's Early, but as a very productive and hardy variety for home use and market I have not heard a single complaint from New York to Colorado. For commercial purposes I am most pleased with Moore's Early. It should be pruned twice as long as Worden; the first and second buds of the new canes are very weak and small, while the third and fourth and even the fifth buds are those that yield the crop. But Worden should be pruned close, as it is the first and second buds, especially the second, that bear the best fruit. Pocklington has a future before it and will be largely planted when its merits become better known. The clusters are very compact, and

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many weigh a pound each. It is a very heavy bearer. My experience with Woodruff's Red is not flattering. It is a very handsome fruit, but disappointing in quality. I prefer the spur system of pruning to the renewal. Some member inquires concerning summer pruning. I have not given this subject much attention, and do not practice summer pruning in my vineyards at Atlantic. There is always so much else to do. Excessive summer pruning greatly lowers the vitality of the vine, but I believe that a moderate amount will be an advantage. When the new canes grow out do not summer prune until the young grapes are formed, and the branches have grown out so as to be in the way in cultivating. Then they should be cut off at a distance of twelve to eighteen inches beyond the last bunch of the fruit; this causes the growth of laterals. I call this practical moderate summer pruning, and would do no more. If too much is done, a magnificent crop will be borne the next year, but the vines will be greatly weakened. I apply a liberal top-dressing of manure every two or three years on all vines, young and old.

J. S. HARRIS: I have seen closely summer pruned vines badly affected with mildew.

J. M. ELDER: Years ago I planted some vines of Hartford's Prolific and gave them no special attention until last fall, when they were pruned close. This year a heavy crop resulted, but mildew appeared when the fruit first began to color. I adopted the California method and stopped it by using flower of sulphur. I believe this to be a preventive.

R. D. MCGEEHON: A few years ago a lady in Cass county exhibited at the county fair some of the finest bunches of Concord grapes that I have ever seen. They were grown by the German system of summer pruning by repeated pinching back of the young shoots. Two years afterward she informed me that the vines were all dead. Our climate is not favorable to the European system of constant summer pruning.

WHAT SHALL WE PLANT ON THE HOME GROUNDS?

BY H. D. MCCOY, KNOXVILLE.

When I think of the interest that you all have in this important subject, and comprehend how ably it should be presented to be in line with your work, already so well done, I shrink from the task assigned me, and beg of you to all come to my

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assistance—as I believe that you will—that you shall not leave anything unsaid or undone that shall be necessary to bring our subject up to the standard where it properly belongs.

Our programme has been so well arranged that on the eve of our separation and departure for our homes, we are to turn our thoughts homeward, and to enquire what shall we do for the home? Such a reminder is truly in line with our work. Indeed, I doubt as to whether our time has been well spent here together, if we have not been prompted in some way, to do something more for the home, than has heretofore been done. I ask is there any tree, shrub, plant, vine, creeper, rose, or flower too grand or too beautiful, or is there any fruit too sweet or too delicious to be planted on the home grounds? I hear you answer: Nothing too fine, nothing too grand, nothing too sweet or delicious, nothing too beautiful. No! nothing too good to plant on the home grounds, and the answer is sensible.

I shall not designate the varieties to be planted in this brief paper, nor shall I content myself by presenting the planter with a full and complete descriptive catalogue of the entire list of Iowa horticultural products, which can be obtained at a very small cost from Iowa nurserymen who have them printed for distribution to their patrons. After the planter has made himself familiar with its contents, he can then intelligently make his own selections suited to his own wishes and tastes, if not limited by a scant purse. I would urge every planter, if possible, to obtain the necessary information needed, by the means provided and by counseling with persons who are interested and well informed on this line. I shall insist that the planter shall deal direct with the nurseryman or his authorized agent, better, if possible, with the nurseryman himself; always patronize the home nurseryman, provided that he is responsible and reliable, as his interest is compatible with yours, and you will be most likely to obtain good stock that is hardy and best suited to your soil and location, which will render the best satisfaction when matured, an item not to be disregarded.

The home grounds should be, if possible, large enough that it may be well sheltered by planting evergreens on the north and west, if advisable, and perhaps on the south, so that when the cold blasts of winter come they may be shorn of their rigors, and that when the heat of summer comes you may recline under its refreshing shadows, while you consider the great future, which they so typically represent to be everlasting—a cheerful thought to help us on our way.

And within such enclosure provided at the home grounds, I will commence by planting the strawberry, the humblest born, yet earliest, a most beautiful and delicious fruit, and so very welcome in its season.

Next the popular raspberry; the soft berry varieties are the most wholesome varieties for family use, followed by the Lucretia dewberry and the blackberry, a very delicious berry, acquired by the least labor of all the berry fruits.

We should not neglect either the currant or gooseberry, each so early, hardy and fruitful, nor the grape, probably the most palatable fruit to eat in its raw state, which is at home in Iowa, and with our deep soil, bright sun and dry atmosphere is bound to attain to a very high state of perfection; it should command our attention sufficiently to plant some of each of the many varieties best suited to the soil and location.

The cherry perhaps ranks next to the grape as being conducive to health and regularity of the system. A prolific bearing fruit, while the Early Richmond is a standard there are other varieties more hardy for the northern portion of our State.

The plum, with so many hardy varieties to select from, bears better planted in clusters. We shall try a few of some of the hardy varieties of Russian apricots in our plum cluster in order to secure better fertilization.

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The peach, the undisputed queen of the fruit kingdom, we hope shall yet extend her domain over the entire State of Iowa.

The Russian mulberry is hardy and makes a dense hedge, bears fruit abundantly that is good for the birds.

What shall we do with the pear? A very fine delicious fruit. On poorish soil, well drained, the hardy sorts are doing well. I would recommend very low heads, cutting back long straggling shoots one-half to two-thirds every spring, and thorough shelter.

The crab has been so much improved and, on account of its hardiness and prolific bearing qualities, it is very acceptable, and can be safely planted in every part of our State.

What would home be without the apple, an all-purpose fruit for the family; a fruit so easily raised, so easily cared for, and yet so much neglected. We should plant some trees of the earliest summer variety and continue through the long list of good bearing, hardy sorts, quality being considered, down to the end of the list, through late summer, fall and winter varieties, ending with the longest and latest keeping variety. Thus, you may have green fruit in its natural state the year round, which is so conducive to good health and happiness. We here for the present, end our list but leave space for the Society to add whatever may seem best to complete the list.

As for nuts, they are quite welcome on the outer home grounds, so as not to interfere with the growth and bearing qualities of our fruits. Yes, fruit brings joy and gladness to our homes. Then let us enjoy the blessing that so richly comes to us by planting and cultivating all the different varieties of fruit that are worthy and profitable on the home grounds. I would not encourage the planting of very many deciduous shade trees to scatter their leaves each fall promiscuously over the home grounds to accumulate as litter, to be constantly removed at the expense of the owner, but have no objection to the planting of a few of the hardy ornamental evergreens, not enough to screen the house from the sight of the passer-by or to hinder the planting of the sweet scented shrub, the fragrant rose, and flowers in abundance which teem with sweet odors of refreshing vigor, inclining our hearts to tenderness and gentle thoughts to flow mingled with sublime adoration and love for the Great Creator and a more brotherly affection for our fellow man. The home beautified and decorated by the planting of evergreens, flowers and plenty of the various kinds of fruits that Iowa soil so nicely and so well perfects, is a home that the owner may well feel proud of. Such a home incites emulation and receives well deserved compliments from the beholder, whether friend or foe. For, by well developed taste and skill displayed in planning you bring honor to yourself by thus having improved the opportunities that so many let slip for lack of consistent economy as the spending of their time and money. So again I say, plant the home grounds with the varied horticultural products produced on Iowa soil in such abundance that we shall have them to enjoy each and every day as the years roll by, until we shall pass from the shores of time to meet again in our eternal home where joy and happiness never end.

DISCUSSION.

R. P. SPEER: Many find that fruits do not agree with them, and find currants, gooseberries and red and black raspberries to be constipating. When digestion is perfect, fruits are excellen Pie plant contains much oxalate of lime, and should be sparingly or not at all

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used where there is any tendency to disease of the kidneys, as oxalic acid is injurious in such cases.

M. A. THAYER, delegate from Wisconsin, in reply to various questions, said: I feel well repaid for my visit with you. I came to get more light in certain lines. One is, how to get more people interested in fruit-growing. In our Wisconsin society the same men held the same offices for many years, and reported on the same topic year after year. The older ones kept dropping out and no younger men came to take their places. The result was that we got into a rut, and we felt it necessary to get in new blood, or the usefulness of the society would be impaired. A change was made; younger men were put in some of the offices. We went to the agricultural and horticultural departments of the University and urged the young men to come in and join us; we sent out circulars, and did a great deal of other missionary work. The result was that we more than doubled our membership. The program is now largely made up of young men. The older ones are not superseded, but are still there to advise and help. Still the question remains, how can we reach the mass of farmers and amateurs, those with no direct pecuniary interests at stake in horticulture? We need their active co-operation in order to do the most good in arousing public interest. Our greatest interest has been aroused on the subject of small fruits. In the last few years strawberry plants have been distributed free to school children, the only condition required being that they report their success in the fall. The offer was embodied in the arbor day circular. Not more than two children in any one family were supplied with plants. About one thousand five hundred children were supplied the first year with six plants each. Last year about thirty thousand plants were distributed. It has stimulated thought in this line, and the interest in small fruit culture has more than doubled in the last two years. I desire to emphasize the ideas advanced as to the necessity of co-operation in the handling and marketing of fruits. At my home town of Sparta there are thirty or forty large and small fruit-growers, and we have found co-operation a success. We appointed a committee to fix prices, and these were posted on a bulletin. Marketing so as to have no glut and no scarcity requires brains and business ability. We have about twenty local societies, the number having doubled in the last three years. One of our officers meets with the local societies to assist in their organization, and we allow the expenses of one delegate from each to attend the state society. The local societies are not confined to counties or districts, but are generally organized where the fruit interests are most flourishing. Blackberries are very profitable when properly managed. Last year two thousand bushels were raised on

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ten acres; the year before, one hundred and forty-three bushels per acre; and this year about seventy-five bushels per acre. I have now eighteen acres of Ancient Briton, one and one-half acres of Snyder, and one-half acre of other varieties. Winter protection and summer mulching are the secrets of success in blackberry culture. The summer mulching is with green clover, cut when in blossom. By winter protection, I mean that the canes are laid down and covered with earth. Two men work together; the rows run north and south, and work is begun at the north end; a forkful of earth is first removed on the north side, next to the roots; one man, using a four-tined fork with the two outer tines removed, bends the tops gently to the north, at the same time the other man inserts a potato fork on the south side of the hill and bends the canes to the north *in the roots*. Blackberry roots are very flexible. A little of the decayed clover mulching is first put over the tops and covered with one or two forkfuls of earth; a furrow is next plowed over them, and the covering is finished with a spade, wherever necessary. The rows are seven feet apart and the plants three feet apart in the row. To have a matted row is a poor plan. My plants are kept in close compact hills, with two, three or four canes, seldom five, in a hill. In laying down, the canes are laid down a little to the west of the hill adjacent on the north, so as to form a continuous row. In the spring, work is begun at the south end and the canes carefully uncovered. By this time the clover mulch is all decayed and is an excellent fertilizer; I believe it pays for itself simply as a fertilizer. For one acre I use what would make about one ton of good clover hay. This green clover is laid early in June in the line of the row, leaving a space of three or four feet between the rows, and this space is well cultivated at least once a week, and often twice a week. One year the clover failed and I used straw instead, with good results. The clover mulching prevents drying out, even in severe drouths. In the spring the new growth is pinched back when a foot in height. This requires considerable extra help in order to have it done at the proper time. No more pruning is done until the following spring. The fruit buds are formed near the tips of the young canes. In the spring, if the prospects for a favorable season are good, I cut off one-fourth of the fruit buds. Even then, if it is a good year, the canes will set twice as much fruit as they can mature. Early Harvest freezes out half the time even when covered. Agawam I have not tried. Kittatiny does very well, but is not so good a berry. As ninety per cent of our berries are shipped over one hundred and fifty miles, we must have a good shipping variety. This we find is Ancient Briton; it is also one of the best quality. I do not think much of dewberries; it is too much work to take care of them. The Lucretia

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is good for home use. Raspberries are managed in about the same way as blackberries. Shaffer is one of the best varieties for home use, but is a poor shipper. The cost of laying down an acre of blackberries is about eight dollars. The old canes of raspberry and blackberry are removed at once after fruiting. Men with pruning hooks follow the last picker right up. The hooks are made of curved knives set in broom handles. Alleys are provided at intervals, and with a horse, with feet protected, and a harrow, four or five acres can be cleared in a day. The old canes are burned as soon as possible; this destroys insect eggs and the spores of anthracnose and other fungi. We ship small fruit as direct as possible to the customers, and ship every day as regularly as possible. By growing early and late varieties a constant succession is kept up; when there is a surplus we club together and ship by freight, often saving sixty dollars on a car. I cover strawberries with marsh hay, and always burn off strawberry beds after fruiting. The plants are set with a spade. My best shipper is Warfield; Beder Wood does very well. We are still looking for the perfect berry. The Swindle has done nothing as yet; Parker Earle is quite promising on our sandy soils; it needs heavy feeding. We believe in plenty of barnyard manure and wood ashes. Sheet-iron cans, holding about two-thirds of a bushel, are distributed all over own, and the wood ashes gathered every week or ten days. The Industry gooseberry is almost a failure with us; Downing is the best, followed by Houghton. The Queen gooseberry is very promising; one gentleman has two bushes which yielded sixty-five quarts each; they are four feet in height and six feet across, and show healthy foliage.

R. P. SPEER: At Cedar Falls the small fruit growers formed an association to fix prices and ship all surplus. This ensured fair prices and brought the grocerymen to time. One man has also bought the entire crop of the leading growers, and thus regulated prices. Growers should remember that inferior berries affect the price of good berries. I wish to emphasize the value of fertilizers on small fruits, grapes and fruit trees. Clover and barnyard manure should be freely used. The best way to get a good stand of clover is to sow Manshury barley and clover together in March. The barley will ripen about July first, and not smother out the clover as oats do. Some trouble has been experienced with clover midge.

W. H. GUILFORD; In twenty years of experience in small fruit culture, I have found a far better method of marketing than hawking them about on the streets. I market only first-class berries and cater to the best class of trade. One groceryman handles all my berries, and he has steady customers who know where the fruit comes from and are willing to pay a good price.

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FOURTH DAY—DIRECTORS' MEETING.

The Board of Directors met at 9. A. M.; President Collman in the chair.

The resolutions in regard to the adjustment of the World's Fair exhibit of Iowa fruits difficulty were discussed.

Hon. Ben McCoy moved to strike out the words "arbitrary and unwarranted."

Carried unanimously.

The resolutions as amended read:

WHEREAS, Owing to a misunderstanding of the plans and intentions of this society in the matter of a fruit exhibit at the World's Fair, the Iowa Columbian Commission, dealt hastily with our duly appointed and instructed agent, Hon. C. L. Watrous, making it necessary for the executive committee of this society to interfere in the interests of peace and harmony, and resulting in the removal of our chosen representative; therefore

Resolved, That we believe our representative, Hon. C. L. Watrous, was faithful and diligent in the line of his duty, doing all that he could with the means at his command, and we deem the action of the Iowa Columbian Commission hasty in interfering with the plans of this society.

Resolved, That we are proud of the exhibit of fruit and the record made by our State, and attribute our success to the efforts of the fruit growers of the State and the able management by Hon. C. L. Watrous and his successor, President A. F. Collman, and others, who ably assisted them.

Carried unanimously.

On motion, the salary of Hon. Ed. Wright, as librarian and custodian, was fixed at $100.00 per annum.

On motion of J. M. Elder, it was ordered that the premium list offered to encourage exhibits of vegetables, be discontinued.

On motion it was ordered that the sum of $15.00 be appropriated for the use of Prof. L. H. Pammel for the purchase of cuts for use in illustrating the report, and for correspondence and clerical work in preparing the report on the common names of cultivated trees and shrubs.

On motion, it was ordered that the president appoint a committee of two from each of the district societies, to prepare fruit lists, it being understood that these committees are to co-operate with committees of the said district societies in the preparation of the report.

The president announced the committees as follows:

Northwestern District—M. E. Hinkley, B. Shontz.

Northeastern District—R. P. Speer, Elmer Reeves.

Southwestern District—Silas Wilson, J. F. Record.

Southeastern District, Ben McCoy, H. W. Lathrop.

On motion it was ordered that the sum of $25.00 be appropriated for the use of Prof. L. H. Pammel in continuing his investigations of the points of growth of fruit trees.

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Hon. C. L. Watrous now presented his bill of expenses in connection with the Columbian Exposition as follows:

Iowa State Horticultural Society in account with C. L. WATROUS.

By amount received from society treasurer			$	600.00
To amount paid for stationery	$	23.55		
To amount paid for telegraphing		80		
To amount paid for express		5.95		
To amount paid for services and expenditures of Messrs. M. J. Wragg, C. Steinman and A. F. Collman		50.12		
To amount paid for expenses, meetings of Eastern, Western and Northern Societies		33.15		
To amount paid for services for one year, and to January 20, 1893		100.00		
Balance January 20, 1893		388.43		
Total	$	600.00	$	600.00
By balance on hand January 20, 1893			$	388.43
By amount received from society treasurer				900.00
To amount paid for fruits, express on same, and cost for labor and expense for collecting same	$	147.96		
To amount paid for railroad fare and expenses, and for help in maintaining exhibit		388.91		
To amount paid for material and labor for fixing and decorating tables and exhibit		75.05		
To amount paid for telegraphing		2.35		
To amount paid for printing		9.25		
To amount paid for postage and stationery		20.90		
To amount paid for pass at fair		3.00		
To amount paid for salary February, March and April		150.00		
To amount paid for salary May, June, July, and August to the 24th.		585.00		
Balance November 22, 1893				94.01
Total	$	1,382.44	$	1,382.44

NOTE.—In accordance with the order of the Directors, the itemized bills of C. L. Watrous and A. F. Collman are deposited with the treasurer of the society.

On motion, the bill was allowed.

On motion, it was ordered that the reports of the society be furnished to members of the district societies, and of all county societies in good working order, and whose members pay an annual membership fee of $1.00. It was also ordered that the reports be sent in bulk by express.

On motion, it was ordered that we retain not less than 200 copies of the report of 1892 and the succeeding years.

On motion, it was ordered that the account of H. D. Bagg of $6.00 for work in crossing fruits be allowed.

On motion, it was ordered that the sum of $500.00, or so much thereof as may be needed, be appropriated for the work at our experiment stations, and for cross-fertilizing.

The bill of expenses of President A. F. Collman while in charge of the Iowa exhibit of fruits at Chicago was now presented as follows:

CORNING, IOWA, December 23, 1893.

The following report was carefully compiled from itemized statement, vouchers and receipts at a meeting with the Iowa Columbian Commission, held at Des Moines, December 15, 1893.

For maintaining fruit exhibit from August 14, 1893, to close of Fair.

A. F. COLLMAN.

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The Iowa Columbian Commission in account with A. F. COLLMAN, *Superintendent in charge Iowa Horticultural Exhibit, Dr.*

To amount paid for fruits, express on same and cost for labor and expense for collecting same		$ 220.32
To amount paid for help in installation and maintaining exhibit, railroad fare and expenses		1,025.17
To amount paid for material and labor for fixing and decorating tables		65.04
To amount paid for telegraphing		7.90
To amount paid for printing		13.00
To amount paid for postage, stationery, drafts and postal orders		10.00
To amount paid for admission tickets, A. F. Collman		3.00
To amount paid for railroad fare and per diem, A. F. Collman, attending Commission meeting for settlement, December, 1893		17.20
Total		$ 2,069.63
Less amount received for desk sold	$ 12.50	
Less amount received for fruit sold	38.72	
Total		$ 51.22
Total net expense		$ 2,018.41
Amount due A. F. Collman, Superintendent State Horticultural Exhibit from Iowa Columbian Commission as per agreement, one-half of expense $2,018.41		$ 1,009.20

Received the above in full,

(Signed): A. F. COLLMAN,
Superintendent Iowa Horticultural Exhibit.

Des Moines, Iowa, December 15, 1893.

On motion the bill was allowed.

On motion it was ordered that as the itemized bills of expenses at the Columbian exhibit, if published in detail, would occupy too much space, that they be published in aggregate and the bills placed on file.

On motion, adjourned to 1:30 P. M.

AFTERNOON SESSION.

On motion, it was ordered that the trial stations under the management of A. G. Williams at Chester Center, N. K. Fluke at Davenport, and George Van Houten at Lenox, be discontinued.

On motion, it was ordered that Prof. N. E. Hansen be allowed the sum of $50.00 for reporting and editing work in the publication of the report of 1892, and that he be allowed the same amount for this work for the report of 1893.

On motion it was resolved and ordered that Hon. C. L. Watrous and President A. F. Collman be requested to prepare brief accounts of their work as superintendents of the Iowa fruit exhibits at the Columbian Exposition, and that the reports be confined to matters of public interest, and not to exceed in length five pages of our annual report.

On motion adjourned.

J. L. BUDD,
Secretary.

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APPENDIX.

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ADDITIONAL NOTES AND PAPERS.

Some of these papers were not read at the meeting, and others were not received in time (having been returned to the writers) to appear in their appropriate place in the report.

DIRECTOR'S REPORT OF FIFTH DISTRICT.

BY D. A. PORTERFIELD, TRAER.

The past year has been full of surprises, and it stands to reason that the fifth district should have its share. The spring of 1893 opened up very wet, and continued so for two months; then got very dry, the ground baked hard; trees bloomed full, and we expected a good crop, but when the time came we were surprised, and have been more or less on the surprise list ever since. The fifth district consists of Benton, Johnson, Iowa, Poweshiek, Marshall, Jasper and Tama counties. In Benton county, apples, except a few Oldenburg, Fameuse, Wealthy, Haas, etc., no crop; plums, quantity good, quality poor; cherries, very light; raspberries, about half a crop; blackberries, almost a total failure, on account of dry weather; strawberries, about half a crop; Concord grapes, good crop, good quality, and good price. In Johnson and Iowa counties, apples, about half a crop, consisting mostly of summer and fall apples; Fameuse, Oldenburg and Roman Stem bore full crops, winter apples selling for $1.50 per bushel; strawberries, short crop; raspberries, full crop; grapes, full crop, and good price. In Marshall county, Oldenburg, good; plums, De Soto, Miner and Wolf, good; grapes, Concord, Worden and Moore's Early, good crops, fine quality, and good price; Snyder and Stone's Hardy blackberry, fair crop; J. W. Nokkan, of Laurel, grew some peaches and pears without protection. As near as we can find out, Poweshiek and Jasper about the same as Marshall. In Tama we had a good crop of Oldenburg, Fameuse, Haas and Wealthy; fair crop of cherries, De Soto and Forest Garden plums did well, Miner dried up and were small; quite a number of farmers grew a plum that seemed to do well, but could not learn the name of it; grapes did well, ripened well, and were a good price. This winter we will have to eat New York apples at about $4.75 per barrel, and they are of poor quality. Down near Toledo they

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grew a few peaches and apricots. We grew in Tama county Gregg, Souhegan, Shaffer, Turner and Cuthbert raspberries. Crescent, Sharpless, Jessie, Bubach, Warfield and other strawberries, all doing well. Blackberries a total failure. Everything is going into winter quarters very dry, except politics, and it may be that next year will surprise us as much as this in the fruit crop, but we must not get discouraged; find out the best, plant it, care for it, and although some years are poor, it will pay you well in the end.

DIRECTORS' REPORT OF TENTH DISTRICT.

BY M. E. HINKLEY, MARCUS.

The summer of 1893 was a season of drouth in the northwest. Barely rain enough for agriculture means a decided shortage for horticulture.

With increased interest in orchard planting, we have a large failure of newly set trees, especially where mulching was neglected. We enter winter with subsoil as dry as was ever known.

Insect pests are increasing, but this year we were free from blight, that dangerous and persistent enemy.

The fruit yield in all varieties was variable throughout the district. In grapes only was there a universal success. All varieties fruited well, and there was no rot reported. Our climate seems well adapted to the growing of this staple fruit, and yet we produce probably not more than one-tenth of the amount needed for home consumption.

In some places plums were injured by drouth. In others there were fine crops. Forest Garden was particularly good. Small fruits suffered from drouth, the best success attesting to right methods, and care. Mr. Terrill, of Sheldon, reports a good crop of strawberries. Cherries did well; Shadow Amarelle was this year the best of seven varieties fruiting on my place. Apples, mostly Wealthy, were few and small because prematurely ripened. Oldenburg and most of the Russians failed to bloom. In short, we are now at ebb-tide, in the sea of circumstances which arouse and direct public interest and efforts to the industry of apple-growing.

THE LEAF FOLDER AND LEAF SKELETONIZER.

BY PROF. HERBERT OSBORN, AMES.

In September I received notice from Capt. C. L. Watrous, of Des Moines, Iowa, that his nurseries were being badly injured by a worm which tied the leaves together and in some cases ate over the surface, leaving the under portion. I

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replied that it seemed probable that there were two species concerned in this injury, the leaf folder and the apple tree skeletonizer, and suggested methods of treatment, but later, in order to get as full information as possible concerning the method of work and the extent of injury of these insects, I took a trip to Des Moines to examine the infested trees.

I found that in portions of the nursery, particularly among the yearling trees, a large proportion of the leaves were eaten, folded and tied together or skeletonized, and judging from the observation made at the time, I should say at least three-fourths of the injury was due to the apple leaf folder *(Teras minuta)*, while a portion was due to the leaf skeletonizer *(Pempelia hammondi)*. The former species draws the leaves together, fastening them with a web of silk and living inside the tube or case thus formed, feeding upon the surface of the leaf thus folded and when this is mostly consumed, probably issuing and feeding upon the other leaves immediately adjacent to its case.

In many cases the larvæ of the leaf folder appeared to be full grown and many of them had already pupated and it seemed that most of the injury had passed and that so far as a further damage during the present season was concerned, that it would hardly pay to attempt any methods of destruction. A number of the infested leaves were collected and brought to the station and from these there have issued during the early part of October a considerable number of moths, all so far as they have issued, proving to beof one species, *Teras minuta*, a small gray or slate colored moth with, in some cases, a pretty distinct orange reflection on the scales of the back.

The life history of this species has been studied by various observers, and particularly by Riley, Le Baron and Weed, and may be stated briefly as follows:

The moths which appear during October and are of a light, slate-gray color, survive the winter and deposit their eggs on the leaves of the trees in the fore part of the spring, in some cases depositing them before the leaves are open, so that the larvæ work in the unopened buds. This injury is sometimes quite serious, because it prevents the opening of the leaves, and for bearing trees it may prevent the opening of the blossoms and thus interfere with the crop. These larvæ mature about the latter part of May and pupate, producing a brood of orange-colored moths, early in June. These deposit eggs again, producing a brood of larvæ during July which mature by the latter part of the month or in early August. The moths from this brood, which are also orange-colored, appear in August and the larvæ resulting from their egg deposition produce serious results during September. Finally these pupate and give rise to the slate-colored form in October, which is the hibernating brood.

REMEDIES.

On account of the protected condition of the larvæ this insect is found a difficult one to treat, but it seems probable that the use of London purple or Paris green will prove fairly effective. While the larvæ feed for the most part within the buds or folded leaves, it is quite evident that they issue from these locations and feed upon the surrounding leaves, so that after they had devoured the material at hand they would obtain the poison distributed over the leaves. Probably the most effective treatment would result from spraying during June and July, although in the case of orchards the spraying for codling moth will doubtless have considerable effect in reducing the numbers of the leaf folders.

Another method which can be used to good advantage, more particularly in nurseries, is that of pinching the folded leaves so as to crush the larvæ within.

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This can be done at any season when the larvæ are at work and while it seems at first thought a rather laborious method it is stated that it can be done at the cost of about $1.00 per acre, an expense which is slight considering the advantage gained in greater vigor of the tree and more perfect ripening of the wood.

In the most of the articles referring to this species it has been treated as the apple leaf tyer (*Teras Cinderella*) Riley, and the lesser apple leaf folder (*Teras malivorana*), LeBaron, but it has been determined by different authors that these two species were simply the summer and winter forms of the same species, and moreover, that they are the same as the cranberry moth which is a destructive species in the localities where cranberries are cultivated. All of these belong to the species known as *Teras minuta*.

THE SKELETONIZER.

As stated in the first portion of this article, the leaf skeletonizer was found responsible for a portion of the damage observed at Des Moines, and as this species is likely to be a more or less constant pest in the nurseries and orchards of the State, a few notes on it may not be out of place.

The moth is a dark purplish brown species with two bands of silver gray on the fore wings as indicated in the figure. This has been considered as single brooded but observations recorded by Dr. C. M. Weed, at Champaign, Ill., show that it may be double brooded, at least in that latitude, and he considers it possible that there may be at least three broods, although the later one working in August and September is the only one usually causing much injury. The larvæ are easily distinguished from those of the leaf folder by working outside on the surface of the leaves and feeding upon the upper portions, leaving the framework and lower epidermis, which turn a rusty brown and give to the trees a decided burnt appearance. The more exposed habit of this species makes it very susceptible to poisonous applications and the only recommendation that need be made is to spray with some arsenical preparation as soon as their work becomes apparent. In nurseries with trees one and two years old this can be done very easily from a wagon driven astride of one of the rows and spraying at once the trees for ten or fifteen feet to each side; for larger trees, which would be injured by driving a wagon over them. some other plan will be necessary, but this could easily be provided for by leaving a space every two rods sufficient for a driveway, or in nurseries already planted, if practicable, the trees after they are two years of age could be removed in rows about two rods apart, furnishing space for driving. If the trees have been carefully treated during the second season of their growth there is little danger of the insects being numerous enough to do any damage the third season.

THE EUROPEAN LARCH AS A TIMBER TREE.

BY N. A. REEVES, WAVERLY.

Our first planting of the larch in groves was in the spring of 1872, and the last in 1876. The total number is about thirty thousand. We obtained the plants at one year old, and set them in nursery rows for two years. When from eighteen

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inches to two feet in height they were set in permanent grove. We had the very best success in planting. The plants were set about four feet apart each way, and only one year was the loss in transplanting more than two per cent. In that year over half the plants on three acres were lost, but that was our fault, the planting being done too late and the buds having started too much. About three acres set in 1873 have done the best, because the trees were planted early, the land was moist and in the best possible condition, and the location a dry ridge. Our larch trees on the driest ridges have done the best; and in November, 1893, I measured the trunks of many set in 1873 and found a few measuring forty-four inches in circumference two feet from the ground. Many thousands of them measure thirty inches in circumference at two feet from the ground, and from forty to fifty feet in height. We have furnished for schools, several flag poles forty feet high that have carried a flag fifteen feet long and six feet wide. These poles are, as a rule, very straight. The smaller poles are from four to six inches in diameter. For fence posts I find that trees four inches or less in diameter last but a short time; but trees six inches or more in diameter, cut from the middle of July to the middle of August and the bark taken off and seasoned two months or more, last as well or better than any other post I have tried. In June, July, and up to about August 15th, these larch trees can be peeled readily. Posts cut the last of July, peeled and seasoned above the ground one month, are about six inches in diameter; they have been set ten years, and upon examination I find no sign of decay. For fuel, it makes too hot a fire and would ruin a stove. I have used it green and like it best green for fuel; but when cut green and allowed to season it makes too hot a fire. Where the tree dies standing and dries out, it is worthless for fuel, as there seems to be no heat in it. The larch has grown more rapidly than either the gray ash, soft maple, white elm, butternut, black walnut, or almost any other tree except the willow and poplar.

We have some five acres that grew nicely until about fifteen feet high, then many of them died. I thought a grub or worm caused it, as the loss was in patches, and now at one end about an acre has grown nicely and is all right; then there are clumps of trees of about one hundred or more that are all right, but I am not sure as to the cause of the loss. In a few years more I will be able to tell more definitely the value of the larch, but now as it stands, it is the most beautiful grove I have ever seen.

THE FARMERS' FRUIT AND VEGETABLE GARDEN.

BY W. S. FULTZ, MUSCATINE.

A good fruit and vegetable garden is conceded by the majority of farmers to be both convenient and profitable, and yet how few farmers have one. The reason universally given is lack of time to attend to it. The truth is that the garden, as found on almost every farm, requires a kind of work that farmers do not take kindly to. They prefer the kind of work that is required to raise field crops.

A good fruit and vegetable garden can be had if properly managed by the same kind of work that will raise a crop of potatoes or corn. Farmers would be glad of

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the rich products of the garden upon their tables, and the pleasure, health and profit they would yield to the family; but the habit of neglect in that matter has become so deeply implanted that no common influence will break it up.

With a positive knowledge that half an acre of ground devoted to small fruits and vegetable gardening would annually produce more profit than five times as much land in any other crop of the farm, thousands of our farmers remain without a good garden. It would seem that pecuniary interests and a regard for the health and comfort of the family would overcome the dislike to culivate a garden, but the aversion to systematic care overrides all other considerations, and the garden remains only in anticipation, or an out of the way concern is set apart where the women folks can expend a great deal of unnecessary energy in trying to raise a few vegetables for the table. These usually consist of a few onions, beets, radishes, and a few sickly currant bushes amidst a swamp of weeds, whose only redeeming feature is that as winter approaches the winter birds resort there daily for a meal of weed seeds. I do not wish to be considered as casting any reflection on the farmers' wives or daughters for the results of their attempts at gardening. They generally do the best that they can under the circumstances. The fact is that they never should have been called upon to conduct this work. The farmer himself with the means at hand could raise all the fruit and vegetables, and do it with less than one-fourth the work required of the women folks with the means usually furnished them. Without a garden the winter diet of the family must mainly be confined to bread, meat and potatoes. When warm weather returns the system demands cooling and juicy vegetables fresh from the soil, yet many farmers have little more than the apology for a garden.

Thousands of farmers' tables are rarely graced with early vegetables and fruits, such as lettuce, radishes, early peas or beans, strawberries, raspberries or blackberries, when they might be crowned with all these luxuries in their proper season by a little labor and systematic care. It is said by medical men that vegetables and fruit as diet are conducive to health, and as most people, and especially children, are fond of garden fruits, it would be policy for every farmer to provide a plentiful supply for home consumption. It would seem that a class of people possessing all the conveniences that farmers have as regards land and the means of caring for it, would consume the largest amount of vegetable food, but the truth is that more is used by the people in cities, towns and villages than by the same number of farm residents. Take a look among the farmers, and it will be found that one-half of them have no garden at all; or at most a little corner in a grain field which is usually overrun with weeds. Others have a place set apart for the purpose, but do not find time to do anything in it on account of the press of field work, and rely on the women folks to do the work, when the truth is that they have less time to spare for the work than the men, who could do the work in much less time and with much less labor. It is an injustice for a farmer to require of his wife or his daughter to make and attend the garden. No one feels the effects of the lack of a good fruit and vegetable garden more than the women folks on the farm during the summer months, when they have to rack their brains to think what to get for dinner, for when the men, weary with labor, come from the fields, their stomachs are apt to revolt against the regular every-day diet of bread, meat and potatoes. But if there are peas, beans or radishes, or other vegetables in their season, with a good supply of fruit, there is no trouble in getting up a dinner that the men will eat with a relish; and but few things are more gratifying to the good housewife than to see the men enjoying the food that she has prepared for them. We regret to have to say it, but the fact rises up in bold relief that

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there is more room for improvement in the gardens of farmers than in those of any other class of people. No farmer should get so busy that he cannot make the home a pleasant place for those who occupy it. The farmer who has no garden other than that described cannot realize the actual benefit derived by having a good garden until he has had the pleasure of being the happy owner of one of these farm necessities.

THE FARMER'S GARDEN AS IT SHOULD BE.

Choose at least half an acre of ground so situated that it can be cultivated with a team. Make the ground rich with manure if not already so. A piece of ground that has been kept rich for a number of years will give better results than one recently enriched after having been worn out. But well-rotted manure can be applied when the land requires it. Prepare the ground thoroughly as for corn or potatoes. Be sure it is fine and mellow; it is then ready for the seeds and plants. Commence at one side and set a row of blackberries, with plants three feet apart in the row. The rows should be at least fifteen or sixteen rods long. Seven feet from the blackberry row set two rows of black raspberries six feet apart and three feet apart in the rows. One row should be Tyler or Doolittle for early, and the other Older or Gregg for late. Six feet from the black raspberries set a row of red raspberries; half the row Turner for early, and half Cuthbert for late. Six feet from the red raspberries set two rows of grape vines, with rows seven feet apart, and the vines eight feet apart in the rows. In each row of grape vines set Warfield or Crescent strawberry plants, putting the plants eighteen inches apart, and in the middle between the grape rows set a row of Capt. Jack as fertilizers for the Warfield or Crescent. After the strawberries have borne two crops, plow them under, as the grape vines will then require all the ground. The spring previous to plowing them under, be sure to set three rows elsewhere so as to have a succession. Get the plants from some reliable fruit-grower, the nearer home the better. In buying plants direct from the grower, the tree peddler's profit, which is always very large, is saved.

As soon in spring as frost is out of the ground, plant two rows of early peas; Landreth's Extra Early is as good as any. Make the rows three feet apart so they can be worked with a horse and cultivator. One week later plant one more row of early peas, and two rows of wrinkled peas, such as American Wonder or McLain's Little Gem, which ripen later. One week later plant another row of late peas. These will give a succession until berries are fit to use. About the time of the second planting of peas we plant onions. These are planted with a seed drill in rows fourteen inches apart. If sets are used they are planted by hand in rows the same width apart, and set about four inches apart in the row. We prefer to raise onions from sets, but have had good success when sowing the seed. We work our onions with a wheel hoe and find it much easier than with a hand hoe. The profits on ten or a dozen rows of onions will pay for a wheel hoe in one season.

As soon as the ground gets warm enough we plant all kinds of vegetables, such as beans, beets, radishes, parsnips, cabbages, etc. These are all planted in long rows and the principal work is done with a horse and cultivator. We find that the Planet Junior meets all requirements. By this method we always have a plentiful supply of vegetables, and to get them requires less work than the old method of hoeing and weeding by hand. The great secret of success in raising small fruits and vegetables is to keep them clean from the start—never let them get weedy.

In cultivating blackberries and raspberries let them grow in hedge-row form about eighteen inches through, plowing down all plants between the rows the same

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as weeds. The black raspberries should be kept in hills, and early each spring cut out and burn all the old wood, and trim the new growth back to about three and one-half or four feet high. If staked and tied they will be much handier to work and keep clean of weeds. Burn all trimmings and old wood so as to destroy all hibernating insects and insect eggs that are usually laid in the canes during the fall. Go through the black raspberries during the month of June when the new growth is about three feet high and pinch off the tip bud of each cane, which will make it grow stocky and send out large side branches which must be cut back to within ten or twelve inches of the main stem when trimming up in the spring.

ROSES.

BY R. L. BLAIR, DES MOINES.

What little I shall have to say will be in the line of the need of garden roses that are iron-clad; something as tough as a crab-apple or a wild briar; that will stand out all winter like a hydrangea, a syringa, a lilac, or a snowball, without coddling or covering. It will not be necessary to descant on the love people have for roses; for this is sufficiently shown by the numbers bought and planted every year, and the admiration excited when a beautiful rose is seen to bloom.

What are usually called hardy roses need to be carefully laid down every winter and covered, else they will be killed down to the roots. My observation has shown me that the majority of people do not care to take so much trouble, hence we see few good collections of roses. Plenty of rose plants are put out every year, but only a few survive our severe winters, if left to take their chances unprotected; and about all we usually see in June are some scrubby Harrison's Yellow, or Persian Yellow, or old clumps of Centifolia, or Moss roses, or Sweet briar, or Dog rose sprouts, that have come up from the roots after the budded or grafted tops have died out from starvation or neglect.

We need intelligent workers with plenty of time and patience at their command who will take our prairie roses or some other tough stocks and cross them on some vigorous kind like *Rosa Rugosa;* then cross the resulting seedlings with some of the few rugged varieties already in use, until sorts are produced that combine the desired qualities—hardiness, color and fragrance. It would be useless to originate new varieties for the mere sake of new shades of color, for we already have enough. No one need expect the blue rose; it would not be pretty if it could be produced, for the color would not be lasting according to the theory advanced in Miss Budd's paper. It would be dull and soon look faded. The roses we already have with very dark red tints and any with a shade of purple are undesirable, for they are dingy a day after opening. Then we would want these new roses to be sweet, for who cares for a rose with no fragrance? Then it must be as hardy as an oak, so as to endure the winter neglect always given to outdoor shrubbery. And then when we get the new rose that is to combine hardiness, color and fragrance, let no one suppose flowers will be produced as big as a modern chrysanthemum, without proper summer care.

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As these remarks are somewhat general, we will state some special needs that can doubtless be attained by whoever pursues the subject properly. We want a good yellow. There is nothing known now except Persian Yellow and Harrison's Yellow, both producing flimsy flowers of no substance; they are thorny, and so hardy that they would not die even if that was much desired. The game of "freeze out" will not work on them. They would throw suckers all over the garden if allowed to grow undisturbed for a few years. There is a light yellow variety called Gloire Lyonnaise, that would, doubtless, make a good cross with either of the above yellows, as it has a double flower. Whoever will produce a good, yellow hardy rose from this or any other combination, will gain money as well as fame.

I would suggest a cross between American Beauty and Rugosa; the former produces large flowers on a large stem; is nearly free from thorns, and has fragrance and color, glowing in a hot June sun with that intense red, approaching the scarlet, that we so much desire in a rose. Rugosa and Gen. Jacqueminot might produce something good on some wild prairie roses, combining fragrance, vigor and color. Rugosa ought to do well on some of the finer mosses, and produce good results. Other good crosses will suggest themselves to the observant worker.

HOUSE PLANTS.

BY GEO. W. CARVER, AMES.

By the term house plants we mean, of course, plants that are suitable for growing in ordinary bay windows, conservatories, etc.

In treating this subject briefly it is hardly necessary to reiterate why a few moments each day should be devoted to the study and care of house plants, and the position they should occupy in each home, be it that of prince or peasant.

The stern and biased utilitarian who seeks nothing but gold around, beneath and above him, he alone dares to ask of what benefit they are. The broad and liberal mind has long since learned that music, art, literature and flowers are one and inseparable.

We need but turn back to the records of past history and its peoples to find the love for flowers increasing and diminishing in direct proportion to the rise and fall of civilization. And it is gratifying to know that in this the approach of the nineteenth century, the demand was never greater than now.

Many do not attempt the culture of house plants because they fear the task too arduous and burdensome. To be sure there is some labor connected with it, also some study, but no labor that yields a better return, and no study more fascinating and pleasing.

I need not dwell upon this line further; the one great question now is what to grow and how to grow it.

The literature upon this subject is large and very good, indeed so large that the persons with only a limited amount of time at their command find it rather hard

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to glean out that which is of the most practical value to them. And, like all theoretical knowledge, the best results can only be obtained by combining it with the practical.

The farmer who has to run to the book to find out when he must plough his corn, harvest his grain and water his stock, will certainly make a bad job of it farming.

Just so with the grower of plants, he should know by their very looks if they are suffering for the want of heat, light, moisture, etc. Now this is not at all hard to do. It simply requires a thorough acquaintance with the plants under his care.

Beginners and amateurs are often perplexed over the question of watering and often ask, How often shall I water my plants? Now the shortest and most complete answer is, Whenever they need it. But this leaves the inquirer knowing no more than before, so we shall attempt an explanation. The very best way to learn this is to study the history of the plants in charge, under what conditions of heat, light, and moisture they have been thriving, either in their original home or elsewhere, and if a produced variety or species, learn under what influences its production was brought about. And in all cases aim as nearly as possible to subject the plants to no unnatural conditions. The last two words should be noted well as they contain the very embodiment of failure.

The moisture contained in a good loose friable garden soil is sufficient for most plants. This soil of course must be in its normal condition and not as immediately after a heavy rain, or in time of aprolonged drouth. Ferns, fuchsias, begonias, etc., will require more water as their home is in moist shady places. Aquatics of course must have plenty of hydrostatic water as their home is in marshes, ponds, swales, etc. A little study in this way will help greatly to elucidate all such perplexing questions.

Another very common mistake which must be rigidly avoided is the buying of a miscellaneous collection of plants from a greenhouse, simply because they look pretty there, the temperature from which they are taken ranging from 60° to 70°; at the home they are drowned one day and neglected for a week, temperature one day up to 80°, another down to 30°, often in receptacles without drainage, and with heavy and unsuitable soils.

And, amidst all these apparent unfavorable conditions, the person wonders what is the matter with his plants. The above directed study will obviate all such difficulties.

By understanding the requirements of plants, he does buy at random, but knows the conditions necessary to meet the requirements of the plants desired; if not, he does not buy them, but makes his purchase as nearly as possible to fit the conditions he must impose upon them.

After the plants are bought taste and tact in the arrangement is of no minor importance. The one who would get the most good from their flowers must be an artist, not in the sense of yielding the brush, but in the skill of the blending of colors. How often we see window-gardens and conservatories filled with really beautiful and well-grown plants, but badly arranged as to color and companionship, such as the association of cacti and ferns, geraniums and carnations. Now as to color; one can scarcely imagine anything more incongruous than the combination of a cold blue and bright scarlet, yet we often see them side by side. In the arrangement of color one should adhere closely to an idea of symphony of color. These may vary from the most intense to the mere shade or tint, as fancy dictates, so long as none of the laws of harmony are violated.

An ideal and pretty way to fill a conservatory is as follows: The conservatory

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to hold about 100 plants, more or less as desired; it should have an east, south and west exposure to the sun; glass top, if it can be afforded, and should contain two benches to hold flowers, one above the other. These benches should be built on the greenhouse plan and filled to the depth of two or three inches with clean, sharp sand to rest the pots upon.

The lower bench, which should be much wider than the upper one, may be filled with roses, ferns, carnations, etc., arranged in groups or interspersed as desired. Fancy leaved caladiums or miniature callas may be arranged with good effect near the glass. A few of the anthuriums with their noble leaves and richly colored spathes, would form a fitting class for one group. The ferns need no description, as they are so well known, but I wish to especially recommend *Cilanthes tomentosa* and *Pteris Victoria*. I should include some of the selaginellas as they are all very pretty and require the same treatment as that of the ferns. Geraniums in variety may be grown upon this bench if desired.

The upper bench should be filled with fuchsias, begonias, coleus, primroses, etc., and all plants requiring a high temperature; the primroses, fuchsias and begonias to be given a rather subdued exposure to the sun.

Those persons who are not fortunate enough to have a conservatory, bay window, double window, or even a single window with full exposure to the sun, need not despair. To these I would suggest a variety of ferns and bulbs, such as hyacinth, crocus, narcissus, and many others too numerous to mention. Who can imagine anything more beautiful and really artistic than such a window, and I have often wondered why those in more favored circumstances did not indulge in the luxury of such a window. In conclusion I will add that every person who is able to own a home is able with a little extra effort to have a suitable place for a few plants, to enrich his thoughts, bring cheer and sunshine to the many dreary days, and to brighten and make glad the long winter evenings.

Music, art and literature all have their societies and organizations for the mutual benefit of their members, and to encourage and stimulate a greater love for these, the "divine arts." Now as music, art, literature and flowers are all so harmoniously blended as to become one and inseparable, every town, village and hamlet should be organized so as to hold an annual flower show.

Papers should be read on the history and merits of new introductions, together with a general conference of all present, giving their success and failures with certain plants.

We need something like this to stimulate, encourage and promote the interests of horticulture in our own justly proud State of Iowa.

NEW ORNAMENTAL PLANTS AND TREES.

BY JOHN WRAGG, WAUKEE.

A number of years since the writer was impressed with the idea that there *might* be some plants and trees, other than our well-known sorts, that would stand our extremes of climate, and that when known would be valued by our planters.

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After a long correspondence with our eminent eastern horticulturists as to what would be likely to succeed, I found that the only way was to plant, watch and care for them for a series of years, and thus determine by actual experience *what was* worthy of future care and attention. This I have done with the following results:

EVERGREENS.

Abies polita.—This is one of the best. A slow growing spruce from Japan, bright green in color, leaves long, thickly set and so very sharp that they are nearly spines, and are said to be persistent for seven years. Neither winter, sun or cold has yet affected it, but it will never be *cheap*, as it is scarce and very few nurseries have it.

Abies orientalis —This beautiful spruce from the Black Sea region is one of the most desirable, if it is found by farther test to stand our winter sun. By giving my trees a partial screen from it, they are all that could be desired, and I hope that with age they will be able to stand unprotected.

Pinus excelsa.—Bhotan Pine. This like the preceding has only one fault, its inability to stand our bright sunlight during the frozen period. It is the most beautiful of all pines; long silvery drooping leaves, in short, a glorified white pine. I have had it five years and think I see with each succeeding year a tendency to withstand the bright glare. I would advise its trial especially in the south part of the State and near the two great rivers.

Cupressus Thyoides, White Cedar.—This is not a "Cedar," but is more of a Cypress. It is not close growing, and will not, we think, prove to be very ornamental; but, as it is the only variety known, and is found in such a limited locality on our Atlantic coast, it should be in the collection of every lover of our native trees.

Thuga gigantea or the Giant Arbor Vitæ, from our west coast, in general expression is much like the above, and I am pleased to find it stands our dry climate so well.

True Cedars.—In the spring of 1892 we planted Cedar of Lebanon, Deodar Cedar and Silver Cedar, or "Atlantica." The two latter give but little promise of being useful, but the "Cedar of Lebanon," to my surprise, went through the last winter in good shape, and has made a fine growth the past summer. I am satisfied that with a little care and protection it can be grown, and I hope many lovers of trees in the south part of the State will plant a few specimens, as from the associations connected with this tree it will always be interesting.

Pinus Cembra.—This tree has often been spoken of by Prof. Budd. I have not had it long enough to express a decided opinion, but from what I have seen of it I think it will be one of the best ornamental trees; this especially from its dark green foliage and its habit of slow, close growth. The popular demand is for fast-growing trees, but it is impossible to have a beautiful evergreen that makes a rampant growth without much pruning and shortening in of branches. The beauty of evergreens consists largely in their close growth. Beautiful trees for lawns, fast growing ones for shelter belts and timber.

SHRUBS.

Acer ginnala, Japan Maple.—This when better known will be a favorite. It makes a beautiful little round topped tree or bush, and in autumn is a mass of brilliant colors.

Exochorda grandiflora.—This is a beautiful hardy shrub from North China and Japan. The white flowers grow in rather loose racemes, and somewhat

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resemble the well known Philadelphus, but it blooms about two weeks earlier, which makes it very desirable.

Xanthoceras.—This beautiful shrub was a pleasant surprise to me. I bought a few plants in France for trial, with very little hope that it would prove hardy enough for this climate. I have now had it six years, and it is all that can be desired. It is a medium-sized bush, with pinnate leaves, and with me blooms very early in May. The flowers are in large panicles, and bear a close resemblance to those of the catalpa, but smaller, followed by a large fruit or seed vessel, looking much like a large walnut before it is hulled. It is a very desirable plant, and I wonder it is not more generally known.

These are but a few, but they are the best of the many that I am trying. If my life and health are spared I shall continue this, to me, enjoyable work of keeping old friends and making new ones of the fruits and flowers. True friends they—when you understand them—and to any and all of my readers who love trees and flowers, I give a cordial invitation to come and see what I have, and am still trying to do, and the latch string is always out.

THE PEA AND BEAN WEEVILS.

BY MISS ALICE M. BEACH, AMES.

These weevils are well known pests. They are widely distributed throughout the country, and in many localities have proven exceedingly troublesome and the cause of serious injury. As they infest commercial products they are easily introduced into new localities, and their ravages are constantly being extended. That weeviled peas and beans are unfit for food and worthless for seed ought to be more generally understood. Growers, seedsmen and consumers should be familiar with the character, life-histories and habits of these beetles, that they may be on their guard against them, and be able to wage intelligently the warfare of extermination.

THE PEA WEEVIL (**Bruchus pisi*, Linn).

The adult pea weevil may be described as a rusty-black snouted beetle, about one-fifth inch long, with a distinct white spot on the hinder part of the thorax, more or less white on the wing covers, and two dark oval spots on the upper side of the exposed tip of the abdomen, which cause the remaining white portion to look something like the letter T.

The adults appear about the time of the blossoming of the peas, and deposit their eggs on the outside of the young pods. The eggs are very small, and to the naked eye appear as yellow dots upon the surface of the pod. The young larva is a small, yellow worm with a black head. It soon

*The Pea and Bean Weevils, Riley, Insect Life, vol. 4, Nos. 9 and 10, p. 297.
Insects Injurious to Farm and Garden, Treat, p. 56.
Common Injurious Insects of Kansas, Kellogg, p. 62.
Bulletin 19, Agricultural Experiment Station, Fort Collins, Colo.

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cuts its way through the pod, and often may be detected crawling over the peas before burrowing into one of them. It leaves a small puncture about the size of the puncture of a fine needle to mark its entrance into the pea. A dark green blotch soon forms around this puncture, and is a sure indication of the presence of the enemy within. The number of eggs deposited on the pod frequently exceeds the number of peas within, but never more than a single larva lives in a single pea. Before pupating the larva eats its way nearly to the surface of the pea, leaving but a thin membrane over its burrow. If the season is prolonged some of the weevils may issue in the fall, but most of them do not come forth until the following spring, when they emerge from seed before or after it is planted, and are ready to begin their work on the growing crop.

As an article of food, peas are generally consumed while green, and only the careful examination of the peas and the rejection of such as are punctured or blotched can insure their being a wholesome article of diet. That the value of weeviled peas for seed has been largely overestimated is quite conclusively shown by the results obtained by Prof. Popenoe in his carefully conducted experiments at the Kansas Experiment Station in 1890. One of these experiments consisted in testing the germinating power of injured and uninjured seed. Of 500 infested peas of ten sorts, but one-fourth germinated, and the partial destruction of the seed-leaves rendered further growth doubtful. Of the same number of sound peas of the same sorts, 97 per cent germinated. To test the truth of the opinion that the larva leaves the germ of the pea untouched or but slightly harmed, 275 peas were examined, and in all but 69 the germ was found to be either wholly or partially destroyed.

In his field experiments, 100 sound and 188 weeviled peas of 23 sorts were planted in parallel rows and subjected to the same conditions. The season was unusually dry and affected the perfect germination and growth perceptibly. Sixty-eight per cent of the good seed grew, and 64 per cent made thrifty plants. Ten varieties of the injured seed never germinated, and of the 13 remaining varieties but 58, or 4.4 per cent germinated, and but 49, or 3.8 per cent, grew to average size and strength.

The adult has never been known to deposit eggs on stored peas, so that seed free from weevils may be secured by confining the peas in a tight place for a year before planting, when the weevils in the peas will all be dead and the danger of injury from them be past. If it is desired to plant the seed before it is a year old, the specific gravity test may be made. The peas may be put into a dish of water and the injured seed, which will float on the top, may be skimmed off and destroyed. Or the peas may be put in a tight bin or jar treated with chloroform, ether or carbon bisulphide, and kept closed for twenty-four hours, at the end of which time the weevils will all be dead. This treatment does not injure the germinating power of the seed. The precaution of ridding the ground of the vines of an infested crop, and the careful destruction of all scattered seed is a preventive measure that should not be overlooked by those who are desirous of securing freedom from this pest.

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THE BEAN WEEVIL (**Bruchus obtectus*, Say).

The adult bean weevil is much smaller than the pea weevil, being little more than one-half as large. It is of a tawny gray color, marked with more or less gray yellowish, without white markings. The eggs may be deposited on the outside of the dry bean—for it has been conclusively shown that this weevil propagates readily in stored beans—but in the field the eggs are deposited in a cluster within the growing pod. The puncture or slit on the pod soon closes up and is not so easily detected as are the punctures in the peas. Besides the difference between the two weevils in the method of oviposition and the ability to propagate in dry seed, there is a difference in the number of larvæ that develop in the seed. While only one is found in the pea, in the bean as many as twenty-eight have been reported in a single bean. The smaller size of the larva and the larger size of the bean make this difference possible. The larva, before changing to pupa, extends its burrow at both ends until it meets the thin outer membrance of the bean. In white stored beans the presence of the larvæ within is clearly indicated by these thin circular membranes or eye-spots, which are of a bluish black color. In dark beans they are not so easily detected. The average time required for the complete life cycle is about nine weeks. Dr. Riley reports beetles as issuing from beans at Washington as early as the second week in August and commencing to propagate at once.

Prof. Popenoe has studied the germination of infested beans as well as that of infested peas. His observations show that 70 per cent of the infested beans were so injured as to be of no value for seed. He writes: "Fifty per cent started; of these three-fifths might have grown into plants as the injury was restricted to the seed leaves. But the remaining two-fifths were variously mutilated by the loss of a part or the whole of the germ or plumule, so that under no circumstances could they have made plants. Here, then, but 30 per cent could have passed the germinating stage, and these, owing to more or less considerable injury to the seed leaves, would probably have made plants of low vigor. In a check lot of perfect beans of the same varieties and in the same numbers, planted alongside, 95 per cent germinated." He found the Lima beans, the English beans, and the French asparagus beans very slightly infested.

As the bean weevil propagates in stored beans, the confinement of the seed for a year in a tight place would avail nothing in securing seed free from weevils. The weevils may be killed in the beans by using chloroform, ether or carbon bisulphide, the same as for the pea weevil. Immersion of the beans for one minute in hot water has been recommended. Mr. Slingerland has tried this remedy, using water at 145° Fahrenheit, and reports it a failure.

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*The Nomenclature and Oviposition of the Bean Weevil, Riley, Insect Life, vol. V, No. 1, p. 27.

The Pea and Bean Weevils, Riley, Insect Life, vol. IV., Nos. 9 and 10, p. 299.

The Bean Weevil, M. V. Slingerland, Insect Life, vol. V, No. 2, p. 86.

Garden Friends and Foes, Treat, p. 19.

Common Injurious Insects of Kansas, Kellogg, p. 63.

The Second Annual Report of Agricultural Experiment Station, Manhattan, Kansas, for 1889, p. 206.

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NOTES BY THE WAY.

BY GEO. VAN HOUTEN, LENOX.

Last winter when the president of the State Horticultural Society asked me to choose a subject for the coming meeting, I decided on the caption above, as I was then arranging for the trip that has been made during the present year. The experimental work of the past, the severe winters and the numerous detrimental influences incidental to horticultural work had made me desire to investigate the subject in other States and countries. The extravagant accounts from the new west and from the Pacific coast had attracted attention, especially as the samples of fruits from those places that I had seen led me to believe that there might be a better fruit country, and as I had long desired to have a personal examination, decided that the present year was the time.

Nothing new attracted attention in Nebraska, for having been in that State before, and knowing something about the conditions there which, on the whole, are similar to the conditions in Iowa, except that horticulture is newer in Nebraska, but little time was devoted to the subject until the mountain regions were reached. The fruit lands of Colorado and Wyoming are so limited, and the work done so recent, that I could not form a just estimate of the possibilities of fruit growing, in the short time afforded for investigation.

Utah has often been held up as a great place for fruit, and I have heard that it is to have a great future. If so it is so far in the future that I could not see it. The small valleys in favored locations seem to be adapted to the growing of peaches and apricots, but while other fruits are said to do well, much experimentation must be indulged in before it is known how successfully they can be grown. The amount of land that can be utilized for fruits is limited, and there is a still closer limitation as all crops there must be irrigated. After the local markets are supplied the remainder of the crops becomes of little commercial value on account of exorbitant transportation charges. The threatened closing of the silver and other mines was having a depressing effect, even in anticipation, and the fruit, and in fact all other interests, were depressed, and with actual stagnation of the principal interests, because of the lack of profits from mining, and the closing of the mines, of which I have since learned, makes me think that the lot of the fruit-grower of Utah is even more discouraging than when I was there.

As the journey was continued westward, I still hoped to find the fruit growers' paradise, and, as the descent of the Sierra Nevada mountains was begun, thought surely that now we are approaching the place where the

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fruit grower has met success, and where failures and tribulations are unknown. But disappointment rewarded my inquiries, as here were insect pests and other enemies more persistent and more constant, if less noisy, than the Iowa blizzard. And if the fruit growers escaped these pests there was one drawback to the industry that could not be escaped; because if there was exemption, or if preventive measures proved successful and a large crop resulted, so there was a surplus, there was still a soulless corporation to deal with, and the transportation charges were so great as to make the crop unprofitable. As nearer approaches were made to the coast the complaint was still more common that fruit growing did not pay, and it is said that many fruit plantations were being destroyed. It is true that there are new plantations being made, and it is also true that in some, special fruits, either not common or of fancy varieties in small quantities, were bringing fair prices, but the fact remains that the orange groves and the vineyards and, in fact, nearly all of the established fruit industries of the coast were paralyzed; and it was said that the canning factories would lie idle during the present summer, and from advices recently received have learned that there is very little being done in that line this year. These facts render the success of fruit growing on the coast problematical for the future. If the west could be insured of low and steady express and freight rates to the east the business might revive, but from present prospects the future is not bright and there is little encouragement for others to engage in the business. It is true that there are a great many varieties of fruits that can be grown on the coast, but it is a fight with insects, and then any surplus is at the mercy of the railroads, so there is little, if any, better prospect for the fruit grower there than for the Iowa grower, and, as land is so much higher, and the water rights so guarded that an outsider runs risks in starting there, the prospect is not such as will appeal to a prudent man from our State to go there to invest in the business. I confess to a feeling of disappointment that came to me after making my inquiries as to the prospects for the fruit grower in the western part of the United States, but as I was to journey farther there was yet hope of finding the place where the business had few, if any, drawbacks.

My next investigations were in what is called the "Paradise of the Pacific," and where it is said there is an ideal climate. Here in this island country is indeed the nearest to an ideal climate that I have ever seen, and I never expect to see a better on this earth, but the question of climate is foreign to the subject, except so far as the interests of fruit growing are depending thereon, and this part of the subject can be dismissed with the statement that there is no climatic drawback except drouth and lack of cold to perfect common varieties of apples, but if there is exemption from destructive effects of cold, there is a surplus of insect enemies and blight that nearly, if not quite, makes up for the difference. It is said that insect enemies have increased here wonderfully lately, and as a matter of precaution this, Oahu, island is under quarantine regulations and cannot send trees or plants to the neighboring islands. Most stringent regulations are being adopted to prevent the spread of insects and blight, and yet most of the islands are badly infested, as I have had a chance to know by personal examination. It is not uncommon for a tree or plant to be infested with three or more kinds of "blight." I quote the word blight, as insects smaller than potato bugs are

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here called blight. If it would not take too much of your time, I would like to tell you of some of the methods of fighting "blight" here, but while these methods are peculiar they are experimental as yet, and are not of special importance to the subject under discussion.

It is a curious thing that the native fruits here suffer as badly from the imported insect enemies as do the foreign fruits, and the wild plants will afford breeding grounds for the fruit pests, so that it will be necessary to rid them of insects in order to be masters of the situation, and as the work is yet in its early experimental stages, you will excuse me from giving an opinion as to the prospects of success; yet I apprehend there is being put forth considerable misdirected effort in the work.

If one should give but a partial statement of what is growing here, and leave the balance unsaid, there would be erroneous ideas formed. For here so many things grow wild and without care, that but for the drawbacks it might be considered the fruit grower's paradise. The bread-fruit grows luxuriantly, and so far as I can learn is without enemies, yet it seems but little used, and if it has been served for me I am not aware of it; yet we eat many things here without questions as to what we are eating. The Papia seems to be free from insects also, but for me it makes but little difference, and I admire their discriminating judgment in letting them alone. Mangoes are troubled with blight, and when I use the word blight it is with the meaning attached to the word here. Oranges and figs are troubled but little, and limes seem exempt. Guavas, one of the best of the native fruits, is badly nf ested, and especially with the cottony cushion scale, which is one of the worst forms of blight (insect enemies).

Cocoanuts and some other trees are also exempt from the depredations of insect or other enemies, but it may be stated that very few of the very many kinds of fruits here are exempt. It is unnecessary to try to enumerate the things that can be grown here, as everything can be grown, but the successful or profitable growth will in a great measure depend on the success of the experiments now being tried for the enemies of the trees and fruit.

Having heard very much of the native apples of this country, you may fancy my disappointment when trying to eat them, if you know anything about them. The poor, miserable, despised Ben Davis is so superior as to leave no room for a comparison between them. And there were many disappointments for me in trying to eat things that were recommended as being edible, but it would take too long to tell of them; but there is nothing here that gives zest to the appetite for fruits such as is given by our Dyer, Jonathan, Grimes, and dozens of our common varieties of apples.

In visiting the several islands I have tried to think of them as if hunting for a home and a place where to engage in fruit growing, but no place has been found where the prospects are sufficient to offer inducements in this line. After turning from the apples of this country with disgust, I thought that pineapples might be an inducement, but with the scramble for water, and the system of land leases, concluded there was no inducement. After all the fruits proper were thought of and considered a poor business, I investigated the coffee business, which is held up here as the coming fortune-maker, but after investigating that business and recalling to mind the story of the lady who refused to buy a hair restorative from a bald-headed

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druggist, I concluded not to invest in a business that most of the residents here avoid.

It is true that there are fruits grown here extensively, but the distance from market and transportation charges are such that there is little profit in the growing, especially for white labor. The regular price here for bananas is twenty-five cents a bunch and often the price goes lower, even here in Honolulu, and on Hawaii have seen them grown so extensively as to be a common feed for hogs. All unskilled labor here is based on the price of Asiatic labor, and the wages are so low that it would require it all to board a white man decently, saying nothing about clothes, so if other things were favorable this labor problem alone would deter white men from entering the business, except as employers, and even here the Asiatics are becoming competitors. They come here as contract laborers, and during the time of the contracts are practically paid slaves, but when the contract is out they become competitors in other fields of labor and in all other industries, except where large capital is required, and as they acquire wealth they make inroads even in those lines of business. It might be stated in passing that the tendency of the laws and customs here is for the wealth to be concentrated in the hands of a few, and the masses are but a few grades removed from slavery. The present provisional government is trying to bring about a reform and it is hoped that it will be successful in the attempt.

The flora of this country is wonderful and a constant delight to me, and if success shall crown the efforts to exterminate "blight," there is a wonderful horticultural future for Hawaii.

There would be a rude shock for those who hold the notion that all trees and plants thrive only near their habitat. All foreign trees and plants (and there are many here), are necessarily far from their original home, and yet many of them thrive here better than in their place of origin. Having seen so many instances of exotics thriving so wonderfully here, I can say that if there ever was, or now is such a rule, there are so many exceptions to the rule that the rule has no value.

My note book is full of things that might be written, but realizing that things of more importance to you will be before the meeting, only this hurried sketch is written.

At the last meeting of our society I had hoped to be present at the coming meeting, but as attendance will be impossible this year, I desire to be remembered by those who do attend, and for this reason respond to the call made upon me by the president of the society before my departure from home. An examination of the calendar reminds me of the approaching meeting, but nothing in the weather here is a reminder, for it is one continuous summer here, with neither chilling breath nor violent storm. But there is so much that is desirable in Iowa, and so much here that is not desirable, that a feeling of homesickness sometimes attacks me.

Honolulu, Hawaii, November, 1893.

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SHELTER BELTS.

BY D. A. PORTERFIELD, TRAER.

It is a fact that if we need one thing in Iowa more than another it is a shelter belt. We need them winter and summer. We have planted deciduous trees, and they have been a wonderful improvement to Iowa, but the great trouble is when the cold blasts come the leaves are gone, and they do not give the shelter required. For a winter shelter there is nothing that will equal the evergreen. It is a shelter when wanted, and in summer it has a cooling and invigorating effect on the weather.

The evergreen reminds us of Pat's definition of whisky, "it was very warming in the winter, and, be jabbers, as soon as summer struck us it had a very cooling nature."

We believe groves of evergreens are healthful to both man and beast. We are satisfied that there are none who will read this report but that will say, "yes, the evergreen beats the world for shelter, and shelter we must have."

Then the question will be, what shall we plant? We have learned that to get men to think alike is impossible, and we suspect Hinkley is now thinking there is nothing like the Black Hills Spruce, Bruning is bobbing up for the Red Cedar, Father Wragg is aching to say a word in favor of White Pine, some one else for White Spruce, and so on. Our theory is to let well enough alone, and we want to-day to introduce to you a candidate who has been with us for years, one who has stood when the blasts came from the north without flinching. In fact, cyclones failed to move him, hot summers and cold winters are driven away by him. When it was so dry a few years ago that even the water was dusty, there stood our candidate, a king among evergreens, showing that nothing could phase it. Empires may fall, parties may spring up and die, banks may smash, silver go to the dogs, and even gold become tarnished, but, Iowa planters, if you want something you can tie to, and swear by, something that will stand cold and heat, wet and dry, something that will stand running over, breaking down and all kinds of rough usage, something that grows from the bottom up, and always remains so, something that will be a thing of beauty in this world after we have gone to the next, something that will put fat on your cattle and make your home beautiful, something that will make your farm worth five dollars per acre more than it is, and be worth in three years ten times what it cost, something you will never regret planting, and that will be a living monument to leave for the family, if you want a candidate with all the named qualities, one in fact containing all that is good and nothing that is bad; if

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you want this kind of tree for shelter, then buy and plant the grand old Norway Spruce. It will never go back on you as other candidates do. If you want something else to put with it, White Pine is a good tree and worthy the respect of any planter.

In planting evergreen belts have the ground in good condition; don't plant on sod, don't plant trees over two feet high; take time to plant well, and mulch with straw or manure, cultivate between the rows, plant at least three rows ten feet apart, breaking joints. If you use spruce and pine put the first two rows of spruce and an outside row of White Pine. Don't let stock run over it, and don't be afraid of planting too many, the more the better. We cannot get too much shelter; plant at once, don't put it off a year or two. In buying don't buy of some one from the east because he tells you his grandfather was the first man to introduce the evergreen, and that his great grandfather was the one who took the first pair of evergreens into the ark. They may not tell you this, but their story will be just as spicy; believe it if you want to, but buy your trees from a reliable Iowa nursery, and whatever you do, buy a good sprinkling of Norway Spruce, plant well, cultivate well, protect from stock, and your children will rise up and call you blessed.

MARKETING SMALL FRUITS.

BY W. M. BOMBERGER, HARLAN.

Fruits can be sold in either the large commercial market or the home or private market. The one who supplies the former is a wholesale grower, supplying markets on a large scale. He is but the attachment of middle men, and if shipments are made to large cities, or sales are made in large cities, channels of trade are so arranged that cartage, commissions, salaries, etc., cut the price of the products so low that they are not as profitable to the grower as other and neglected markets. It is often the case that wholesale growing and marketing is made a success, but only by those who have a ready advantage from long experience and familiarity with the minutest details of the work. The natural difficulties in the way and the entire absence of wild fruits will always make small fruits salable. While there may be temporary gluts occasionally in the markets of one kind of fruit or the other, they serve only to discourage the timid and cause them to drop out of the work. By their cheapening the products as a food they cause large and free consumption, and very ready and steady prices to growers who produce good crops off years. The nearer the grower is to the consumer of small fruits the more profitable the work. It is possible for a grower to be near the consumer and work on a considerable scale and maintain prices much higher than in city markets, filled with the products of every clime by our modern system of rapid transportation. Smaller operators in the work, and growers that have the chances of personal acquaintance with customers, have large opportunities for marketing fine products

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at special prices, and for destroying the sale of inferior products shipped from cities to neighboring towns. So the grower of small fruits is sure of ready sale of all his products if he will only do his work, and establish a reputation for the growing of the finest and best, and never disappointing customers when they come to him for the best. This growing of good fruit and marketing it on the strength of a good reputation can be carried so far that customers who have the soil and opportunity to produce it will prefer to buy it grown with high quality from a specialist at an advance over any market price. This is the best way to sell fruit and this kind of a trade is the most desirable. Operations on a large scale are only proper and profitable when they are a multiplication and extension of this kind of work. Five, ten and twenty acre tracts of fruit can be grown in this way in almost any agricultural country near towns of from but a few hundred to several thousand inhabitants. And there are large opportunities and good markets undeveloped in many sections that are but awaiting development. The fruit market of the west is not yet half developed when considered in this light.

SMALL FRUITS IN IOWA.

BY WM. H. HOLMES, DAVENPORT.

It is but the remembrance of what I have been that assigns to me a subject from which I withdrew myself years ago to devote my spare time to the strawberry only, selling them and buying other kinds, which, with my limited grounds, I could well afford to do; and I have learned more by listening to the experience of others than by my own observation.

I have seen nothing to change an opinion formed almost forty years ago, that there is but little in the soil or climate of this admirable State to forbid the profitable culture of small fruits, compared with other crops, and in proportion to the skill and attention necessary to insure that success. But I think the experience in later years will satisfy any careful observer as to the danger of blind following of growers in eastern states. Varieties which do well east of the prairies may not, usually do not, succeed in Iowa with its long dry time. Scarcely a berry originating in New England, or south or west of this, will bear profitably in Iowa.

Especially has this been the case in eastern Iowa, to my certain knowledge. In 1891 we had an exceptional and excessive rainfall up to July, and afterward *none* until even the snow and sleet went off on frozen ground; and the same last fall, and this, going into winter quarters with no moisture in the ground. And without water we can do nothing.

In 1891 I lost six or more acres set in the spring—an entirely new experience; and I fared but little better than in 1892 or 1893. At this time I set sixty new kinds. We have to compete with foreign berries shipped from

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the south, where, as a rule, they have not paid the grower a fair compensation. In the region south of here, except where the grower operated on a moderate scale, and depended on a home market for all except early and firm varieties, they have given a very scant, if any, return.

My observations for nearly thirty years satisfy me that our method of trying new varieties is radically wrong, and that growers should not buy at $2 per dozen or $5 per hundred from introducers, but should buy only from local nurserymen, now to be found everywhere, who should recommend only varieties proven by trial to be better adapted to our soil and climate than the old varieties. The strawberry is very local in its adaptation. This method of dissemination will retain within the State a very large amount of money, encourage the local grower of plants for sale, and serve the grower of fruits as well.

Most growers cultivate too many kinds. Varieties sensitive to frost should be excluded, *however large or productive.* I grew a great variety from necessity, testing for myself; but five to six are enough if good and reliable in all seasons. In my experience the kinds best in a very wet season are not so good in dry years, so that one year is not a complete test of any variety. But the kinds good in a dry season take very kindly to a wet one, and so are safest, as are staminate varieties, for all seasons.

The best yield comes from a pistillate, in general, but one failure in many affects the average, and, to take no risk of that kind, I would avoid them. Capt. Jack has never failed me wholly but once in ten years, an excessively wet one at blooming time. I would trust it yet as a good average yielder for a long time, and yet Capt. Jack is *very* local in this vicinity. Were I young, instead of eighty, I would grow strawberries, among them Warfield and Capt. Jack, because although small in berry they have good shipping qualities. But I would not raise extensively more than six kinds—early, medium, and late. I would give a wide berth to new and untried kinds, born and raised under circumstances we could not hope to furnish one year in five. I would plant Older raspberry, Ancient Briton blackberry, and a very few hardiest red raspberries. Of grapes the Niagara and Moore's Diamond, with the old reliable Concord, which I raised for years and sold at a good price, while my more conservative neighbors retained the Isabella.

Iowa is a good State for small fruits, but it sadly needs original men who dare look at the facts and adapt themselves to them. One great essential for small fruits is manure and plenty of it; not necessarily stable manure, which is hard to get in some places and very costly, but ashes, bone dust, superphosphate, etc., a liberal supply, carrying no weeds to lessen the fruit and cause much expense in cultivating.

When we know enough, small fruits, as well as large ones, will enter largely into our daily diet. Then will the present ill health give way to sound bodies as the home of clear brains and sound nerves, the condition on which life will be strengthened and lengthened till few fill early graves.

There is no soil in Iowa on which anything else will grow where strawberries, or some other small fruit will not grow. No one need go without at least a home supply, except from sheer laziness and a disposition to throw blame on Providence, instead of ascertaining what the soil wants and the climate needs, and supplying them. Small fruits can be raised as certainly as corn or potatoes, and in the economy of a life they are just as useful in securing a

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rounded-out humanity. Growers of berries should plant no more than they can care for well, even if they have the plants on the place. If you cannot do otherwise, give them away to deserving poor ones, who would not otherwise have even enough for home use.

AMATEUR ORCHARDS.

BY J. J. SMART, HUMBOLDT.

If you had asked me for a paper on an *immature* orchardist, my case would give the most disgusted one imaginable. A year ago last spring I seeded down my beautiful young orchard. I cut the first crop of hay and then let in my sheep to eat the second crop, and all seemed to be well. But last spring I turned in the sheep for a few hours each day at first. After awhile they were left in longer until the grass dried up, and then they commenced to browse the trees, and would even stand on their hind feet to pull down the limbs. Then the grasshoppers came and attacked the foliage, soon cleaning off every leaf, so that when the last army of caterpillars arrived there was little for them to feed on. The caterpillars also invaded my plum orchard with a vengeance that was terrible.

I have plowed under the sod in my apple orchard, and it will be some time before I seed down again. I have learned some lessons at great cost, and will try to profit by them in my future orchard management.

ORIGINATING NEW VARIETIES OF CHERRIES.

BY CHRISTIAN STEINMAN, MAPLETON.

It seems that this field is not very much occupied in the west. I have planted many cherry pits the past twenty years, ranging in quantity from a quart to a bushel, and it seemed to me that every insect and fungus enemy would attack the seedlings. Whenever I had a very fine stand of young plants, with now and then a fine specimen—which often was not very hardy—by fall nearly all would be mildewed.

The seedlings of Late Richmond show their relationship in tree and fruit. All come late into full bearing, but still there is marked difference among the different seedlings.

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Pits of Dyehouse produce stronger plants, which begin to bear sooner, and have the thick healthy leaf of the Dyehouse. One tree a year ago bore a few cherries about as large as a red bird cherry of the eastern half of the State, but this year they are as large as the parent.

The seedlings of English Morello are very feeble and slender; very slow growers, but early bearers. Fruit mostly smaller than English Morello, pit larger, quality about the same. It is hard to get scions for grafting, as almost every bud is a fruit bud. Most of them bloom with the very last of the English Morello; hence are good bearers.

The Ostheim cherry when fully ripe is a very fine cherry, but so far has not proved very fruitful. It may do better when the trees are older.

We will after a while have cherry orchards in Iowa, so that cherries will be shipped out, not in.

My advice is to plant cherry pits, especially of the Russian varieties, and we will soon have cherries in abundance.

I am glad that Prof. Budd keeps talking about chestnut growing. In northeast Iowa chestnuts were grown over thirty years ago.

We have not yet found out all that Iowa is able to produce. Believe in Iowa, and stick to Iowa, should be our motto.

REPORTS OF SUPERINTENDENTS OF EXPERIMENT STATIONS.

G. B. BRACKETT, DENMARK, LEE COUNTY, DIRECTOR.

Experiment Stations: Owing to the difficulty of obtaining suitable help last spring, but little was done in the line of cross-fertilizing; and in consequence of very unfavorable weather, what little was done was not very successful. As the result of the work done two years ago, we have 144 trees growing at the Des Moines station. These are crosses of Jonathan, Mother, Grimes Golden, Red Canada, Westfield and Roman Stem with native Crab As soon as these are large enough, scions will be taken from them and worked on bearing trees, so as to test their quality as soon as possible, and then a selection of the best will be made and their power of endurance will be tested.

From the best information obtainable from the U. S. Division of Pomology and other sources, the following list of fruits were selected last spring and purchased and sent out to the several stations for trial:

Strawberries—Princess, Timbrell, Greenville, Swindle and Leader.

Columbus gooseberry; Dwarf Mountain cherry; and to four of the southern stations, the Crosby peach, claimed by Mr. Hale to be one of the hardiest of peaches.

Mr. C. G. Patten, of the Charles City station, reports as follows:

The five varieties of strawberries received last spring made a fair growth. The Columbus gooseberry grew finely, the best of any new variety yet sent out by the society. The Dwarf Rocky Mountain cherry also did well.

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Four out of five plants of the Pecan received last year are growing, and the same number of the Persimmon.

One French and one Brackett pear, and the full number of the Lincoln, five in all, are growing; the latter seems to be the hardiest. Two of the Seboldi Walnuts are especially vigorous and hardy.

Of the cross-fertilized apples, now three years old, there are forty trees; the two-year old are small, about fifty trees; the last year's planting is a better stand than before.

All of the Russian plums set two years ago were injured last winter; on the best of them the spurs on the bodies were killed. Moldavka and Voronesh Yellow were killed entirely. The Cheney sent me, I fear, are not true; they were nearly all killed last winter. Early Red had another variety mixed with it, so I cannot report on it. Pottawattamie killed back considerably. Wyant, Hawkeye and Rockford would have given a good crop only for the excessive drought that prevailed during the summer, and Wolf and De Soto are a partial crop.

The cherries set two years ago were much injured by the severity of last winter. The varieties are, 23 Orel, Shadow Morello, Lutovka, Shubianca and Bessarabian.

Of pears—Russian, 9 M, 15 Orel, 110 Voronesh and Kurskaya continue to be most hardy; 110 Voronesh have not borne yet, but seem extra hardy. The Longworth, an American seedling, has borne two years, and on high ground is very hardy. None of the trees mentioned have blighted. The black knot has attacked the Russian plum trees.

The most promising Russian apples, judging from my own experience and that of others, are the Good Peasant, Longfield and Blushed Calville.

As the success or failure of all experiments depends upon conditions, soil, climate, exposure, etc., it is very important that the superintendents of stations should report upon these points for the benefit of those who wish to repeat the experiment. It is also desirable that they be on the alert for new points, and to report to the director such as they wish to have for trial.

W. H. Guilford, Dubuque, Dubuque County:

Apples.—Yellow Transparent was the only Russian that matured a crop.

Plums.—The Early Red set a full crop, which was destroyed by curculio and gouger. Orel No 19 matured a few fine specimens. Merunka bore large purple fruits of best quality. This seems to be free from black knot and curculio. Moldavka is a yellow plum as large as Lombard. The tree is the cleanest and thriftiest of the European plums grown at this station. Wolf, Rollingstone Forest Rose and De Soto gave good crops.

Grapes.—Moore's Diamond heads the list as the best white sweet variety. It is very productive. Woodruff Red is of fine flavor and is a good bearer. Eaton gave a few bunches. Niagara is gaining in popularity on our bluffs. Worden and Moore's Early are the most profitable.

Raspberries.—We find Mountain Seedling tender. Kenyon crumbled badly. It is large and late, and the flavor seems poor. It seems hardy.

Currants.—North Star is small and sweet, about like Red Dutch. Ruby Castle seems identical with Victoria. Kramer's Seedling seems to be the most promising new variety. It has a fine leaf, and loads with fruit.

Gooseberries.—The Triumph continues to do well. It is very large but of

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poor quality. It needs crossing with Houghton. Early Golden is smaller in size and fine in quality, but a shy bearer.

Strawberries.—Beder Wood continues to be a strong, healthy plant and the most productive of our list. Parker Earle is a large, late, good variety and very productive.

Miscellaneous.—At my station we have three *Prunus pumila* plants which at the collar are about two inches in diameter and four feet in height. One of these bears a fruit as large as the Richmond cherry, with a small pit. I am propagating this variety by grafting on plum stocks. I have *Prunus pumila* on plum roots that grew three feet the first season from root grafts.

M. E. Hinkley, Marcus, Cherokee County:

Cherries.—All of the cherries on trial continue to do well. Späte Amarelle this year bore the most fruit, and the fruit was the largest in size.

Plums.—All of the *Americana* family of plums received for trial are doing well. Rockford seems to be an early bearer of solid-fleshed, dark-skinned fruit. Pottawattamie is tender with us and the fruit is poor in quality.

Apples.—Of the Russian apples, the Anisim, Romna, Plodovitka, Rambour Queen, Karabovka, Voronesh Rosy, Vargulek, Serinkia, Borovinka and Hibernal are most promising. No apples this year. Even the prolific Longfield was barren.

Grapes.—I find Woodruff Red poor in quality. The Mary is too straggling in bunch. The Cottage shells too much. Moore's Diamond is too good in quality; it is unsatisfactory only for the reason that we don't get enough of them.

Gooseberries.—The Triumph proves to be difficult to propagate.

H. A. Terry, Crescent, Pottawattamie County:

Apples.—This was an off year for apples. Of the Russian varieties the Hibernal, Longfield, Anisim, Romna, Cross and Blushed Calville gave a light crop, and several other varieties bore a few specimens.

Pears.—Garber's Hybrid has never blighted on our grounds, neither has it borne any fruit.

Plums.—The Russian plums bloom but as yet have borne no fruit. The Ogon and Botan bore a light crop of very fine fruit the past season.

Cherries.—All varieties sent me are good, but Griotte Imperial, Early Morello and Wragg so far have been most fruitful. The Lutovka, Sklanka, and some other new Russian varieties have not fruited here yet.

Grapes.—Woodruff Red, Moore's Diamond, Mary, Cottage and Alexander are fine varieties and productive, with fruit of good quality. Eaton, Moyer and Green Mountain seem to be tender here.

Raspberries.—Older is very satisfactory; Kenyon is a fine grower, with fruit of good size and fine quality.

Gooseberries.—The Industry and Triumph both failed after growing one year.

Strawberries.—We had a light crop.

Currants.—North Star does not seem to be an advance on the Red Dutch; Ruby Castle is identical with Victoria.

John Wragg, Waukee, Dallas County:

Strawberries.—We consider Beder Wood one of the best.

Raspberries.—Palmer is too small. Nemaha is no better than Gregg or Ohio. Muskingum is good in quality and worthy of further trial.

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Pears.—All those received have proven hardy, but one tree of Idaho has died of blight.

Plums.—All the trees received are doing well, but no fruit as yet. Some of the Japan varieties bore some fine fruit. I am testing a number of new plums that bid fair to prove valuable.

Cherries.—Did not bear.

Grapes.—Moore's Diamond was the only one fruiting. It will prove one of our best white grapes.

W. C. Haviland, Fort Dodge, Webster County:

Apples.—Of new Russian apples on trial the following are good trees and free from blight: Nos. 455, 354, 410, 152 M, 322, 18 M, 365, 24 M, 327, 30 M, 240, 200, Gipsy Girl.

Cherries.—Large Montmorency, Bessarabian, Lutovka, No. 3 Orel, 25 Orel, Shadow Marello, Lithauer Weichsel, Sklanka, Amarelle Bunte, Weir's No. 23, King's Amarelle, Süsse Früh Weichsel and Weir's No. 12, are all good trees.

Plums.—Hawkeye, Pottawattamie, Maquoketa, Rockford, Cheney and Wyant are good trees.

Grapes.—Green Mountain is a good grower. Moyer is a light grower and seems a poor bearer.

O. A. Kenyon, McGregor, Clayton County:

Apples.—The following have proved hardy and free from blight: 5 M, Early Sweet, 984, 599, 24 M, 402, 9 Vor., 11 Orel, 38 Vor., Borovinka, 30 M, Plodovitka, 382, 10 Orel, 10 M, Yellow Transparent, 5 Simbrisk, 21 M, 59 Vor., Simbrisk No. 4, 67 Vor., Simbrisk No. 3, 55 Vor,, 4 M, 413, 324, Duchovoe, Patten's Greening, 22 M, Antonovka, 1 M, 361, 261, 987, Arabka, 247, 18 M, Titus Riga, 387, 20 M, 5 Orel, 327, 361, 24 M, 30 M, Borovinka.

Pears.—The following are hardy in tree and free from blight: Nos. 345, 418, 391, 361, 35 M, 516, 392, 3 M.

Cherries.—The following are hardy and in good condition: Double Natte, 16 Riga, Cerise de Ostheim, Späte Morello, Red Morello, Griotte du Nord, Sklanka, 25 Orel, Brusseler Braune, Abbesse. Späte Morello and Cerise de Ostheim set in 1885 have borne several crops and are very valuable varieties.

Plums.—The following are fine trees: Forest Rose, Wolf, Rollingstone, Orel 19, Cheney.

Grapes.—The Coe is small, seedy and not desirable. Niagara is fine in bunch and berry, and fair in quality; and the same may be said of Mason Seedling. Montefiore is not desirable in fruit. Iowa Excelsior is fine in appearance but not high in quality; and the same may be said of Helen. Empire State is good when fully ripe. Cottage is good in all respects. Worden is better than Concord. Woodruff Red is good in quality. Cottage is as good as Concord. Mary is a very fine variety. Moore's Diamond is very good when fully ripe. Eaton is large in berry but poor in quality. Moyer is small and sweet. Green Mountain ripens very early, very sweet and fine in quality.

Raspberries.—Tyler is early and productive. Nemaha and Palmer are late, large and fine. Muskingum is good and hardy.

Strawberries.—Bubach and Jewell only produce a few large berries. Jessie does not meet our expectations. Beder Wood is a good bearer of

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good fruit. Bidwell is not satisfactory. Lady Rusk is good in quality. Parker Earle is very promising.

Gooseberries.—Triumph is not entirely hardy and mildews.

Currants.—Crandall is hardy, but has no value. Ruby Castle is very desirable. North Star is not as hardy as Ruby Castle.

Miscellaneous.—Riga Pine is hardy and fine. Caragana arborescens is pretty in tree and hardy. Hydrangea paniculata grandiflora is hardy and beautiful. Rosa rugosa, 88 Riga, is hardy and very fine in foliage and flower. Black Hills White Spruce are growing finely.

John C. Ferris, Hampton, Franklin County:

Apples.—The following varieties are hardy and thrifty: Babuscheno, Battulen, 30 M, 169, Bogdanoff, 152, 4 M, 161, 24 M, Rosenhager, 15 M, Borovinka, Duchovoe, Longfield, Repka Malenka, Good Peasant, Plodovitka, Silken Leaf, 12 M, Romna, Aport, Kursk Anis, Peter.

Cherries.—All Russian cherries are healthy in tree.

Pears.—All the pears have blighted except No. 392.

Plums.—The Hungarian prune and Early Red plum are perfectly hardy and as thrifty as De Soto. Moldovka is not thrifty. Wolf has given the most fruit the past year. Pottawattamie, Rockford, Hawkeye, Wyant, Maquoketa, Cheney, and Poole's Pride are good trees as yet.

Grapes.—Moore's Diamond gives the best satisfaction of the new varieties I have on trial.

Currants.—North Star and Ruby Castle seem about like Victoria. The Crandall does not bear as well as the wild black currant of the Black Hills.

Raspberries.—Older is hardy and fruitful. Nemaha seems much like Gregg.

Strawberries.—Bubach, Jessie, Beder Wood and Parker Earle are valuable. I have no use for Jewell or Lady Rusk.

C. F. Gardner, Osage, Mitchell County:

Apples.—It has been an off year, but the Good Peasant fruited well.

Pears.—Bessemianka fruited with me for the first time. The tree is perfect. Idaho blights badly, as does No. 516. All the other Russian varieties are doing well.

Cherries.—The Russian varieties are all doing well. The Sand cherries are hardy, and the fruit is equal to the best Choke cherries.

Grapes.—All the varieties sent to me for trial are doing well.

Plums.—Early Red, Rollingstone, Wolf, Hawkeye, Wyant and Rockford are unusually healthy in tree, and most of them bore fine fruit the past season.

Currants.—Ruby Castle and North Star are vigorous growers.

Gooseberries.—Columbus is a fine, healthy looking variety, without mildew. Industry is not thrifty.

Raspberries.—The Kenyon is a strong grower, and is hardy. The fruit is very large, but I hope to report on the quality better next season.

Strawberries.—I have fifteen or more varieties, and the Gardner the past season excelled them all in size and quantity of fruit.

C. L. Watrous, Des Moines, Polk County:

Ruby Castle and North Star currants received in 1891 making fair growth; no fruit. Of grapes, Alexander's Winter, Brilliant, Rommel and

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George W. Campbell received at the same time, the last three being from T. V. Munson, all have made good growth. No fruit except from Rommel. This fruit is handsome and of high quality for the table. Promises to be valuable for home and market. The Mary grape and Empire State, received in 1890, both fruited abundantly. Both are of a very high quality and deserve extensive trial, at least for family use and near market. Kansas and Nemaha raspberry, planted in spring of 1893, have made vigorous growth. Much like Gregg. No fruit. A new raspberry sent out from Lawrence, Kansas, has fruited abundantly. Berry is large, of good quality, and is fine for home or market. Sent out by G. C. Brackett. Of strawberries received this year, Leader, Timbrell, Princess, Swindle, Haverland and Parker Earle have all made fair growth except Timbrell, which seems rather feeble. No fruit as yet. Of hybrid apples received from Jackson Dawson, Arnold Arboretum, from crosses made in 1891, there are about one hundred and forty which are making good growth. They are staked, marked and recorded in a book. These are nearly all from seeds of our native apples, crossed with such varieties as Jonathan, Grimes Golden, Red Canada, etc. Their future will be watched with much interest. There are also a few hybrid grapes from seeds of Worden crossed with Agawam and Empire State. The vines seem vigorous and healthy, but have not had time to fruit. There are also under observation at the station some forty varieties of plums, both native and foreign, not in common cultivation. These are all top-grafted upon Miner stocks and will be planted with a view to future observation and hybridizing. There have been on trial at this station a great many Russian fruits. It may be said of them, as a whole, that their days were short and full of trouble. Nearly all succumbed to one ailment or another in the nursery row; of those that came to fruiting age only two have seemed worth preservation at this point, Longfield and Yellow Transparent. The last of these seems fatally subject to blight upon my grounds, although seeming to do better elsewhere. No Russian plums have given evidence of value. About twenty-five varieties of Russian cherries have been planted and propagated for fruit. Several winter-killed in the nursery. None of them have seemed healthier in wood or foliage than Early Richmond.

Several varieties have fruited, the fruit in all cases being of medium or small size, sour, and inclined to bitterness. No one seems to me to be worth ground where the Early Richmond is a success as it is at Des Moines. Of the Russian pears planted three or four have seemed fairly healthy and hardy, but have not fruited, except Bessemianka. This last has seemed exceptionally healthy until the summer of 1893, when several trees of twenty feet or more in height, blighted to death, rendering further trial necessary before judging of its comparative value in connection with the old eastern sorts.

R. P. Speer, Cedar Falls, Black Hawk County:

Apples.—Many of the Russian apples have produced fruit in my orchards, a large number of which are promising; but at present I will only recommend Yellow Transparent and Anisette for commercial orchards, and Noble Red Streak, Repka Kislaya, and Vasilis Largest for family use. I would recommend the Longfield if I were certain that the Good Peasant was not more desirable.

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Cherries.—I can recommend the following varieties: Späte Morello, Early Morello, Brusseler Braune, Bessarabian, Shadow Morello and 24 Orel, and I value them in the order given.

Plums.—Most of the Russian varieties are hardy, but the blossoms have not proved hardy with me. Some of them may prove profitable on bluff soils. The De Soto is the most satisfactory native.

Grapes.—Worden and Moore's Early are most valuable on drift soils.

Strawberries.—Of thirteen varieties tested recently, Rusk, Haverland, Warfield, and Beder Wood do best on my soil. Parker Earle is prized by many, but is unprofitable with me.

TOP-GRAFTING THE APPLE.

BY C. G PATTEN, CHARLES CITY.

In carrying out your instructions to collate experience on this subject, your committee issued a circular letter and accompanying questions which were sent to fully sixty persons in Iowa, Minnesota, Wisconsin, and Illinois, and which were responded to quite generously by a large number. Much interest is manifested in this work and many facts have been obtained, some of them very valuable.

Two of the sheets with their accompanying answers are submitted with the hope that they will add much to the interest of this article. We have selected the best samples of replies, and had all been as thorough and concise it would have greatly aided your committee.

Perhaps the whole ground was not covered by the questions, but we believe that the information gained will fully justify the wisdom of the undertaking. And if the ideas of any do not seem to be incorporated in the report as fully as they would prefer, we must beg their indulgence on account of the great variety of opinions and the forms of answers received.

It must be remembered that the influence of stock and scion is yet very imperfectly understood even by a majority of intelligent horticulturists; and especially is this seen to be true when it is discovered that there is so great a difference in the adaptation of a single variety to several kinds of stocks, or of one kind of stocks when worked with several varieties. We are very confident that had this influence been more generally understood, and the experiments made at a lower point on the stocks, that the results would have been much more satisfactory.

The report of Hon. H. W. Lathrop of Iowa City so emphatically illustrates a principle in top-grafting that I give his report in full. It proves most conclusively that the seedlings of a species make far better unions with varieties of their own species than with crossed seedlings. In fact, it will be noticed in Mr. Lathrop's report that in every case the union was *perfect*, and that these stocks and tops with but one exception, are of American origin. The report is as follows:

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The soil is a clay loam with yellow clay subsoil. The stocks used were Early Red Margaret, Paradise Winter Sweet and Siners Autumn Sweet. The top-working occupied two and three years, one-half or one-third of the tree being grafted in one year and completed the next, or at farthest the third year. The union in every case has proved perfect. Of these three varieties used as stocks the trees were distributed promiscuously, and I cannot now name the particular stock on which the varieties were worked, some of them on all three. The stocks were all five years old when top-grafted, and the tops are now all twenty-seven years old, except Wealthy, which is twenty-five years old. The results are as follows:

Very hardy, early bearing and productive: Oldenburg, Fameuse, Wealthy.

Hardy, early bearing and productive: Maiden's Blush, Rawle's Genet, Jonathan, Newport.

Hardy, late bearing and productive: Benoni, Willow, Autumn Strawberry, St. Lawrence.

Hardy, late bearing and unproductive: Rome Beauty, Red Canada.

Tender, late bearing and unproductive: Indian Rare Ripe, Red June.

E. R. Heisz, Nora Springs, Iowa, reports his experience as follows:

"Oldenburg was used as a stock for Wealthy, Winsted, Fameuse, Northwestern Greening, Astrachan and Walbridge. The stocks were four years old when top-grafted. Results have been as follows: *Wealthy*, tops 10 to 20 years old, hardy, union perfect, medium early bearing, productive; *Winsted*, tops 10 to 15 years old, hardy, union perfect, late bearing, unproductive; *Fameuse*, tops 6 years old, union perfect, bore a few this year; *Astrachan*, tops 10 years old, hardy, union medium, late bearing; *Walbridge*, tops 18 years old, medium hardy, late bearing, productiveness medium, my opinion of it, waning; *Northwestern Greening*, both on Oldenburg and Whitney stocks, stocks 3 years old when top-grafted, tops 6 or 7 years old, union perfect on both stocks, bore a few this year."

An erroneous opinion on this subject (provided it be counted worth anything) is liable to do much harm and no good. Would use older stocks of varieties that are valuable kinds, such as Oldenburg and Hibernal, and work them higher up, and then if the varieties you work in them from any cause fail, you may secure good trees from the shoots they will throw out. But when worked in nursery we should only use kinds that have proved valuable. Of the following I have only one tree of a kind, but do not think that one tree proves much: *Wolf River on Oldenburg*, top 10 or 12 years old, stock 6 years old when top-grafted, hardy, union perfect, medium early bearing, productive. *Fall Orange on Oldenburg*, tops 10 or 12 years old, stock 5 years old when top-grafted, hardy, union medium, productive. *Wrightman on Tetofsky*, top 12 or 15 years old, stock 5 years old when top-grafted, hardy, union perfect, medium early bearing, productive. *Seek-no-further on Tetofsky*, top 12 or 15 years old, stock 5 years old when top-grafted, hardy, union perfect, late bearing, productive. *Jonathan on Minnesota Crab*, top 12 or 15 years old, stock 6 years old when top-grafted, hardy, union perfect, medium early bearing, productive. *Grimes Golden on Oldenburg*, top 12 or 15 years old, stock 7 years old when top-grafted, nearly hardy, union perfect, medium early bearing, productive *Grimes Golden on Whitney*, top 10 or 12 years old, stock 8 years old when top-grafted, hardy, union perfect, early bearing, productive.

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Varieties only a few years tested that promise well are Melinda on Oldenburg, Hibernal and Shield's Crab, Northwestern Greening on Oldenburg and Hibernal.

One other illustration bearing on this will be given in full. The other reports show that the Russian apples with but few exceptions unite very poorly with the Siberian hybrids or crosses with our American apples, and I suspect with the Russian crosses as well, and that these Siberian crosses, such as Transcendent, Shield's, Sweet Russet, Virginia and other hybrids unite much better with the American apples, though far less perfectly than the pure seedlings of our American varieties. The more apple blood, or the further removed from the Siberian, the better the union; however, there are notable exceptions. Northwestern Greening unites well with most of the Siberians, also the Wealthy, and even the Fameuse taking well on the Soulard Crab, and the Bethlemite on the common wild crab, doing fairly well, and Geo. J. Kellogg, of Janesville, Wisconsin, gives Yellow Transparent as perfect on all the counts on Hyslop. He says Longfield on Transcendent is perfect, but it hastens the ripening of the fruit. Twenty-two varieties grafted on Cherry Crab bore well five years and all died.

Mr. Edson Gaylord, of Nora Springs, and one other report, speaks better of this stock. But Mr. Pugsley, Woodbine, Iowa, has tried Transcendent, Hyslop, Soulard, and Little Red Siberian; they did well for a while and then failed. Has tried a good many trees; the union of Iowa Blush is good. Jonathan worked on Gros Pomier a valuable tree. Tried many varieties of Russians on Plumb's Cider, stocks too large, pushes grafts too fast, and blight destroyed nearly all. Repka and two Calvilles an exception. Rawle's Genet and Gros Pomier are productive on Tetofsky.

It seems to be fully demonstrated by the reports that the union of a stock and scion of different species often results otherwise than as we expected, sometimes even where the union is perfect, as in the case of either the American or Russian apples on the Siberians, or their hybrids with either of the families named, and sometimes with a union of Russian and American apples. Often the bearing is retarded, and it sometimes results in earlier maturity of fruit and dwarfing of the tree by over-production, as with Longfield and Wealthy, and in an occasional enlarging and lowering of the quality of the fruit, as with the Wealthy on Hyslop Crab. From the reports and my own observation I feel sure that the early failure of some of the combinations is caused by a lack of the proper nutrition of the root, either from the unequal size of the cells, or of the uncongenial juices of the stock and scion, gradually poisoning and weakening the tree.

N. K. Fluke, of Davenport, says that he thinks the Mercer County wild crab would be a good stock, as Jonathan, Baldwin, Maiden Blush and some others took well on two year trees. Says the Stark, Golden Russet and Baldwin have done well on Virginia, eight to twenty years tops, two to four year stocks. Stark twenty year tops, medium union, very productive, bears every year. Brackett and Lincoln pear four years on this stock, fairly well; the latter is best.

W. H. Guilford, of Dubuque, gives Ben Davis worked on Whitney No. 20 as good on all the counts, after fifteen years' trial. L. G. Clute, Manchester, Iowa, says Red Astrachan on a seedling eight years old, thirty-two years grafted is a perfect union, bears early and is productive. Root-grafts of same sort dead ten to fifteen years since.

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It appears that some of the oldest orchards in Iowa are top-grafted trees, and so far as can be learned have been more fruitful and longer lived than root-grafts of the same varieties.

Prof. Samuel B. Green, of the Minnesota Experiment Station, while not having experience long enough to warrant a reply to the questions, regards it as a most valuable line of work.

R. P. Speer, of Cedar Falls, says Wealthy grafted on Oldenburg fifteen to sixteen years are better than root-grafted trees of either sort. Longfield on Silken Leaf is very fruitful. Hibernal on White Astrachan is healthy, fruitful and large and smoother apples than root-grafted Hibernal. He thinks top-grafting promotes fruitfulness, with some exceptions. Oldenburg with him has been quite a success as a stock, though varieties have generally been tardy in bearing. Willow and Ben Davis on this stock are healthy. After fifteen or sixteen years' experience in top-grafting, and a long and intimate experience with the Russian apples, he sums up his estimate as follows: "I am convinced that we will *find no good, long-keeping apples among the Russians*. No such apples that are *sufficiently hardy* for our *drift soils* can be found among the *American varieties*, and two years' experience with cross-fertilized seedlings (fifty-five varieties on the Whitney), satisfies me that so many of our seedlings will inherit the characteristics of the wild apple that we will get more desirable results from experiments in top-grafting than in any other way."

James Hearst, of Cedar Falls, says Grimes Golden on Oldenburg, one-third of Oldenburg top left, is a success, while Jonathan is a failure. But Fameuse on Soulard is an undoubted success.

A. W. Sias, formerly of Rochester, Minnesota, found Yellow Transparent a failure on Red Anis.

F. K. Phoenix thinks budding better than grafting; would at least use only the tongue or whip graft. Has found trees grafted on crab stock rather slow in bearing.

R. C. Keel, of Rochester, Minnesota, is sure that the stock influences the bearing tree. He says Wealthy, twenty years grafted on Transcendent, and Melinda also, are good trees; while root-grafts of the Wealthy, killed down in 1884-85, but have sprouted into bush-like trees, and are again in full bearing. He has picked in one year fifteen bushels of Melinda from some of his trees. Longfield has been a success on the Orange Crab, but he prefers Virginia for a stock.

C. L. Watrous, of Des Moines, Iowa, reports Mother, Cooper's Market, Roman Stem, Genet, Mann, Roxbury Russet, Annette, Peck's Pleasant, Northwestern Greening, Rambo, Thaler, Milam, Grimes Golden, Ben Davis and Wealthy, worked six years on three-year Whitney No. 20, are all hardy, and union medium to perfect. It seems that Grimes Golden bears young on this stock.

Mr. Pugsly, Woodbine, Iowa, reports Gros Pomier a good stock for Jonathan and Price's Sweet; moderately good for Ben Davis and Roman Stem. Rawle's Genet and Haas productive on Tetofsky. Wealthy and Tetofsky good on Transcendent crab; all on trial fifteen to seventeen years.

After an extensive experiment, J. V. Cotta, of Nursery, Illinois, now gives the preference to the Shield's crab for a stock; it has no leaf blight or mildew of foliage, while Virginia has. He thinks well of Hibernal,

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Zolotoreff, Charlamoff, Vasilis Largest and Enormous for stocks. The last on account of its rapid growth, but the last two would not be hardy enough in north Iowa as has been proven here. None of these have blighted with him. With Shields he reports the union about perfect on two year top-grafts of Salome. Isham Sweet, Minkler, Hamilton, Fameuse, Twenty Ounce, White Pippin, Black Annette, Roman Stem, Willow, Grimes Golden, Scott's Winter, Ben Davis and N. W. Greening; while more or less overgrowth was noticed on Whitney, Milton, Lake Winter and other crab stocks.

Mr. B. F. Ferris, of Hampton, Iowa, reports Wealthy and Pewaukee ten years grafted on Transcendent a perfect success in every way, at Iowa Falls. Kaump, Pewaukee, Iowa Blush and Allen's Choice on Whitney and Virginia unite perfectly or nearly so, but too soon to report on productiveness.

Asa D. Barnes, Waupaca, Wisconsin, has not much faith in top-grafting, but believes in *short roots* and long scions; would not hazard much only on trees that were young and thrifty or on crabs that bore inferior fruit.

O. C Cook, of Oconto, Wis., has, he thinks, a valuable seedling apple for a stock, as it is a rapid grower. The Hibernal he values highly as a stock, He further says, I find that I can raise tender varieties of apples top-grafted. if worked on the right kind of stocks, that would not live root-grafted. Says Yellow Transparent, Ben Davis, Jonathan and Wealthy are good on Oldenburg and Oldenburg seedlings; Fameuse, Ben Davis, Enormous, Wolf River, Grimes Golden and some others good on Hibernal, productive and union perfect.

Edson Gaylord, of Nora Springs, sends a valuable report. Wolf River on Oldenburg and Chickasaw crabs, medium in bearing and productive. Antonovka and Noble Red Streak the same on Oldenburg, Switzer and Ben Davis nearly perfect on this stock. Wealthy on Transcendent, and Gideon on Minnesota also; Fall Orange slow in bearing on everything but Hyslop. Northwestern Greening a medium success on nearly all crab varieties. Age of top generally from seven to thirteen years, and all hardy to very hardy, the Ben Davis among the latter.

A. L Hatch, Ithaca, Wis., has had fair success with Wealthy, Longfield and American Codlin on Transcendent, twelve-year tops and four-year stocks, but wants stocks of more perfect union, so that trees will not overbear one year and be barren the next.

Charles Hirschinger, Baraboo, Wis., says: Give me hardy varieties, root and branch; then, and not till then, can we expect success. Pewaukee on Oldenburg, twenty-one years, had been exceptionally good.

Christian Steinman, Mapleton, Iowa, finds Summer Harvey very hardy on Oldenburg and Price's Sweet. Fall Spitzenberg and Winsted Pippin stocks seven to ten years, tops three to ten years. Iowa Blush on Alaska, three-year top, five-year stock, perfect. Longfield grafted on Alaska, Walbridge, Doyle, Royal Table and Price's Sweet all hardy and medium or perfect union, four years grafted, productive. *Doyle* is a *rapid grower*.

W. M Bomberger, Harlan, Iowa, reports Ben Davis, Russet, Red Astrachan, Chenago Strawberry on seedlings all hardy but the latter. Twelve to fifteen-year tops, three to five-year stocks, union perfect or fairly so, and fairly to very productive. Red Astrachan and Ben Davis very productive.

A. J. Philips, West Salem, Wisconsin, reports Virginia a No. 1 stock for

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the Utter, better than Transcendent or Oldenburg. He says Wealthy on Virginia is *no experiment*, it is a sure thing. Doylestown, McMahan and Wolf River he gives a No. 1 rating on Virginia. Haas on Whitney No. 20 productive only on alternate years. Utter six years on Oldenburg and Fall Orange eight years, are not satisfactory. In conclusion, he says: "I find that top-working increases the hardiness 25 per cent. Will top-graft into the limbs of 100 trees in the spring. Virginia, the best stock he has ever tried, has Grimes Golden on it and gets good crops. Age of tops generally six to ten years; stocks three to five years. Soil clay with gravel and limestone subsoil.

Reports would seem to indicate that the Transcendent crab is a valuable stock when grafted low in body or limb, for Wealthy, Yellow Transparent, Melinda, Pewaukee, Northwestern Greening, Antonovka and Longfield. It seems to be apparent from the reports that those varieties that are productive as root-grafts are also productive as top-grafts, and that if there is much over-growth of the top, that the tendency is to excessive crop one year and none the following year. It is further apparent that if a desirable variety, like the Fameuse, is fairly hardy in any given locality, it may be made entirely so by top-working onto a suitable stock that is thoroughly hardy. The most desirable age for top-working is from three to seven years old. It is now well known that there is such an influence between the stock and the scion that where they are not strictly harmonious, if grafted low into the trunk or into quite a low top, they will often be fairly successful, when if grafted high or into the limbs a foot or two in length, it would be a failure. Grafting should be done on mild days in March and the fore part of April to insure best results. About one year in ten we have such a severe winter that it would not be prudent to venture an extensive work in top-grafting as stock will be more or less injured.

The successful orchards are oftener reported as on clay or clay loam, but several of them are prairie soils.

Prof. J. L. Budd says:

"The Gros Pomier has not been a fair stock to test top-working, at Ames, as during the winters that wrecked so many orchards the stock was injured in all cases, except when worked with hardy scions. For instance, all of the Waupaca county, Wis., seedlings, and others of that grade of hardiness, were killed, both stock and top. With the Russian tops the stocks were not appreciably injured. With Knowles' Pippin, McIntosh Red and others given in list I send, the stock and top were injured, but recuperated so as to give crops, and are still in pretty good condition. With the one thousand or more Gros Pomier stocks used, the great lesson is, that the relative hardiness of the variety used in top-working affected the hardiness of the stock, yet the American seedlings named are none of them hardy enough to stand test winters as root-grafts."

Professor Budd gives the list of trees now standing that have borne well or fairly well, top-grafted on Gros Pomier in 1878-9: Kentish Fillbasket, McIntosh Red, Red Russet, Wrightman's Blush, Fameuse Sucre, Mt. Beet, Magog, Longfield, Peffer's Yellow, New Porter, Iowa Keeper, Wythe, Knowles' Pippin, Northern Spitzenburg, Excelsior, Burlington, Hill's No. 2, Scott's Winter, Maryland Red Streak, Yellow Transparent, Antonovka, Cross, Boiken, Winsted Pippin, Nos. 245, 324, 41 M, 217, 105, 240, 152 M, 158

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M, 424, 317, 22 M, 185, 378, 980, 413 Dept., 382, 332, 24 M, 327, 4 M, 30 M, 356, 585, 599, 361, 135 M, 14 M, 13 M, 5 M, 340, 553, 288, 387, 12 M, 224. Arabian has done well on Oldenburg stocks.

Thanking the many friends, both in and out of the State, who have aided your committee in making the above report,

I am most respectfully yours,

C. G. PATTEN.
Chairman of Committee.

Mr. B. A. Mathews, of Knoxville, Marion county, Iowa, has had a long and extensive experience as an orchardist, with root, top, and stock-worked trees. His experience is so valuable for the south part of the State that I give his report and accompanying letter nearly in full. The following varieties were top-worked on seedlings twenty-four to twenty-six years ago, stocks from three to six years; all hardy except Red June, not quite; and union perfect on all; Jonathan, Grimes Golden, Willow, Red June, Sweet June, Early Joe, Cole's Quince, Jefferson Co., Haas, Am. Summer Pearmain, Gloria Mundi, Rawle's Genet, Smith's Cider, and Stark; the latter is tender and not productive; neither is it on Smith's Cider, Mundi, Haas or Jefferson; the remainder are either productive or fairly so. Roman Stem, thirty-six years, productive and very hardy. Williams Favorite, forty-one years, very productive. Jonathan, nineteen years, on Tetofsky, fairly so. Ben Davis, twenty-five years, tolerably hardy, bears early, very productive. Perry Russet, same age, not productive. Duling Sweet, Baltimore, Chenango, Summer Pennock, Fall Orange, Flora Bellflower, Pewaukee, 20 Ounce, and Fall Swaar, twenty-five years, all hardy and productive. Wagner is not productive nor quite hardy.

KNOXVILLE, IOWA, December 4, 1893.

C. G. PATTEN, *Dear Sir.*—Yours of 28th inst. is received, and blank filled out. Twenty-five years since I put out a fifteen acre apple orchard, containing several hundred varieties. Rather the larger portion of these trees were either top or stock worked; the rest were grown in the usual way, consequently I have had a chance to test, side by side, all of our leading sorts grown both ways.

Were I planting another orchard here the common root-grafted trees would be used, with a few exceptions. Winesap does not root well, nor does Williams Early make a tree, unless on something else. Now and then a sort having a tendency to injury in fork or trunk would be benefited by grafting into the limbs of some other variety.

In this locality, for commercial purposes, an orchard wholly of Ben Davis is perhaps more profitable than anything else in the apple line. For the past twenty-five years I have had nearly eight hundred of these, about equally divided between top and root-grafted trees. I cannot see that one is preferable to the other; in either case the orchard should receive the most complete broadcast culture, and after bearing commences should be well manured. This method will lengthen the life of the orchard several years.

At the time of planting these trees, I also planted about three hundred and fifty Jonathan divided pretty equally between root and top-grafts. The former made the larger trees; as to bearing I can see no difference; both have done well, except an orchard of about one hundred and twenty-five trees planted by itself which has borne practically nothing.

It is not clear to me that it would pay a man in this locality to raise an orchard

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composed entirely of top-grafts; there would be much more work and expense attached to it, while it would pay in dollars and cents only with exceptional sorts.

For orchard purposes there is a vast difference between a bog and a high timbered ridge, and questions raised by reason of the influence of soils, locality, stocks and pollen should not be confounded. For instance, suppose that ten years ago an orchardist had had an isolated tree each of Jonathan, Willow, and Winesap, these we may suppose to have been root-grafted, of course we know now that they would have borne very sparsely. Then again not a great way from these, suppose there had been a few trees of these varieties top-worked and standing near each other; these would have been fruitful and regarded as an object lesson which should set at rest the whole controversy, as to the desirability of top-worked trees, and yet perhaps there would have been but little in it except a matter of pollination.

Very truly yours,

B. A. MATHEWS.

IOWA FRUIT EXHIBIT.

Chief Samuels, of the Department of Horticulture of the World's Fair gives the following estimate of the Iowa exhibit of fruits:

WORLD'S COLUMBIAN EXPOSITION,
OFFICE OF THE DIRECTOR GENERAL OF THE EXPOSITION.
Chicago, Ills., U. S. A., January 29, 1894.

MR. A. F. COLLMAN, Corning, Iowa.—*Dear Sir:* Among the many fine collective exhibits of fruits at the Columbian Exposition, that of Iowa was one of the very best. Under your supervision the tables were artistically arranged, every variety of fruit which could be obtained in your State was properly labeled, the different species conveniently grouped for comparison of their special characteristics, and the exhibit was always in a neat and orderly condition. There is no doubt that such an exhibition of fine fruit attracted much attention to your State, and as a result many persons from the east learned for the first time what Iowa's genial climate and rich soil could produce. You and the other gentlemen in charge of the exhibit deserve the gratitude of your State for the excellent display made, and the courtesy and attention you gave to all inquiring visitors.

Yours very truly,

J. M. SAMUELS,
Chief Department of Horticulture.

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REPORT OF DELEGATE TO MINNESOTA.

BY PROF. N. E. HANSEN, AMES.

The meeting of the Minnesota State Horticultural Society was held January 9th-12th, at Minneapolis, and was well attended by the veterans in fruit growing, as well as by the younger workers. Your delegate was handsomely entertained at the home of Wyman Elliott, ex-president of the society, one of the most active workers in the cause of Minnesota horticulture. Space will not permit of even a brief synopsis of the entire meeting, hence I will only present a few points gleaned from the papers and discussions.

Strawberry Pollination.—In unfavorable seasons the crop is often much diminished by lack of proper pollination of the blossoms. Two plants of pistillate to one plant of staminate varieties were recommended as the proper proportion; also that the most perfect pollination, and hence a much larger crop was secured by intermingling them in the line of the row, instead of planting in alternate rows as usually recommended. The only objection is that it will not be possible to dig plants true to name, if varieties are intermingled in the row. But some of the members did not consider this an objection, because they did not think it at all advisable to set out plants from an old bed. They said that a bed should be set out each year with plants taken from a bed set the preceding year; this insures strong, vigorous plants, which are much better than those obtained from alleys of fruiting beds.

Orcharding.—There was considerable additional testimony favoring elevated sites, and a northeast or north slope. Planting on a ridge favors air drainage which is an essential to successful orcharding. One member reported his old trees of Oldenburg and Wealthy sound and thrifty on a north slope, while those on the south side of the same knoll had died out in six years.

Windbreaks were generally considered very detrimental if closely planted so as to prevent all circulation of air. In unfavorable localities on the open prairie, rather open windbreaks planted at some distance from the orchard, so as merely to stop the force of the wind and not prevent the needed circulation of air, were thought desirable by some. The only advantage claimed was that less fruit was blown off by strong winds. But the general experience showed the need of having unobstructed circulation of air on the north. Orchards protected by close windbreaks on all sides had been most damaged. This coincides with the general experience in Iowa.

The recently advocated method of boxing the trunks of apple trees and filling with earth for winter protection and as a remedy for sun-scald was

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discussed. In localities very unfavorable to orcharding, such as the Red River valley, some thought it of service in the early years of growth. But the boxing should always be removed early in the spring. If left on all summer the bark becomes tender and sun-scalds much worse than if no protection had ever been given. Protecting the stems with wire screening, or lath woven with wire, was deemed better, and can be kept in place both winter and summer. Some recommended the wooden veneers, recently offered for sale, for protecting the trunk, and cornstalks for shading the main forks during winter and early spring.

The plan often recommended of planting apple trees close both ways with a view to thinning out later, was condemned by several of the oldest members. The thinning is generally too long deferred and when done the trees left are injured by sun-scald. On trees closely planted the fruit is paler and not so abundant, and the crowded, weakened condition invites disease. The trees at the ends of the rows are generally the soundest. The best plan appeared to be to plant close in rows north and south, say twelve to fourteen feet; but the rows far apart east and west, say forty feet. The trees will protect each other by affording needed shading of the trunk, and the blossoms will be properly fertilized, while the forty feet spaces between the rows will give free circulation of air.

Plums.—Some favored planting close together in a double row, with wide spaces between, and mixing varieties in the row. This plan ensures proper pollination of the blossoms and needed circulation of air.

Several members reported good results in making chicken yards out of the plum orchard, as it greatly lessened injury from the curculio and gouger.

Mr. J. S. Harris said the Cheney plum grows readily from root-cuttings. They should be cut from three to four inches long, tied in small bundles and packed in sand in boxes in the cellar, and planted in spring with top end an inch or an inch and a half beneath the surface. If cut sloping at one end it is easy to distinguish the top and butt of the cutting.

Raspberries.—Mr. M. Pearce reported excellent success in laying down red rasperries as early as the last week in September and the first week in October, while canes were still green. He plows close to the canes before covering, throwing the earth away from the canes; then plows again, throwing the earth up to them. The canes are then laid over in an easy curve and soon covered with earth sufficient to entirely coyer them. They are laid down between the rows and not in the line of the row.

Apples.—Eighteen hundred and ninety-three was an "off" year, owing to the very heavy crop of 1892. Fruit growers generally were hopeful and interest in fruit culture is increasing. Many Russian varieties were favorably mentioned in the various reports and discussions. On the tables were noticed fine plates of Oldenburg, Hibernal, Patten's Greening, Anisim, Wealthy and several other varieties that had been shipped to the World's Fair and back again and kept in cold storage.

Wild Olive.—Mr. Dartt of Owattonna, and Judge Moyer of Montevideo, reported the Wild Olive (*Elæagnus angustifolia*) hardy and thrifty. The propagation of this species should be pushed by our nurserymen, as it is a beautiful silvery leaved tree of size suitable for lawn planting. The spicy fragrance of its blossoms is an added attraction. It is sometimes called Russian Olive.

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TRANSACTIONS

OF THE

SOUTHEASTERN IOWA

HORTICULTURAL SOCIETY

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SOUTHEASTERN IOWA HORTICULTURAL SOCIETY.

OFFICERS AND DIRECTORS FOR 1894.

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VICE-PRESIDENT.

W. H. HOOPES, - - - - - - - - - - Muscatine

SECRETARY.

C. W. BURTON, - - - - - - - - - - Cedar Rapids

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Second District.—D. F. Bruner, Toledo.
Third District.—A. Branson, New Sharon.
Fourth District.—Henry Schroeder, Sigourney.
Fifth District.—T. F. Luckenbill, Huron.
Superintendent of Exhibits.—Jonas Miller.
Place of meeting, Wapello, December 4, 5, and 6, 1894.

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LIST OF MEMBERS.

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L. H. Pammel.....Ames
Eugene Smith.....Ames
Mrs. A. Richmond.....Ames
M. Brooks.....Ames
H. Osborn.....Ames
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Miss May A. Nichols.....State Center
Prof. H. Osborn.....Ames
Geo. W. Carver.....Ames

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PROCEEDINGS

OF THE

TWENTY-FOURTH ANNUAL MEETING

OF THE

SOUTHEASTERN IOWA HORTICULTURAL SOCIETY,

HELD AT AMES, DECEMBER 5, 6 and 7, 1893.

TUESDAY AFTERNOON.

The meeting was opened with prayer by Abner Branson, West Branch.

DIRECTOR'S REPORT OF THIRD DISTRICT.

BY A. BRANSON, NEW SHARON.

Although our fruit trees went through last winter in fair condition, we have to report another "off year," especially of the apple and cherry. Yet we can report a few orchards of the apple in the district that gave a fair yield. A Montezuma paper reported that there was shipped by one firm over one hundred barrels, and that others had shipped about as many; but this was the exception. Some of the old orchards, surrounded with tall trees, yielded forty or fifty per cent of a crop. Hardin Tice, of Oskaloosa, gives it as his opinion: "That the tall trees partly protected the fruit trees from the severity of the electric shock of the spring of 1892, from which the trees that were the most exposed did not recover vitality sufficient to develop a crop this season, as very many did not even show bloom."

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In a great part of the district there was not enough for home use. Summer and fall varieties were the most plentiful. Fruit was inferior and had considerable scab.

Cherries were a complete failure; as the fruit buds did not appear to be damaged by the winter, the failure was a surprise to us all. Austin Gray, of Eddyville, gives as the cause of failure: the dry weather of the previous season, this preventing "the storing up of starch in the fruit buds."

Plums were quite variable; some trees were well loaded with fine plums, while others of the same variety had but few to mature. This was especially the case with the Miner; some specimens were as fine as I ever saw. Strange as it may be, European varieties were as fruitful, or more so in some instances, than the natives. Lombards were well loaded. Several very fine plates of a variety marked Spanish King were shown at our fair. They so nearly resembled the Lombard that we could not but believe that they were Lombard under a new name.

As far as we could learn, wherever the Kieffer pear has been planted it has been fruitful. Some fine specimens, and unknown varieties, were shown, from Sigourney, at the World's Fair.

Peaches are reported to have borne a moderate crop, wherever there were trees of suitable age.

Grapes were a plentiful crop, probably nearly up to the average, and the best in quality, as we had a good fall for maturing.

Strawberries, from one-half to three-fourths of a crop, though they promised better in the early spring, but the very dry weather cut the yield short.

Raspberries, about the same average. Blackberries, one-third of a crop.

DIRECTOR'S REPORT OF FOURTH DISTRICT.

BY W. S. FULTZ, MUSCATINE.

In this district the crop of all kinds of fruit except grapes was very short. Apples, peaches, pears and cherries were almost a total failure. Strawberries, raspberries and blackberries were not more than one-third of a crop, but prices were correspondingly high. Grapes were the largest crop for several years, but prices were so low that the crop was unprofitable. More than 50 per cent of all the raspberries, both black and red, were ploughed up last spring, and but few were planted to take their place. Insect depredations have been so great the last few years as to discourage the planting of many raspberries. Strawberries and raspberries failed to make plants during the dry weather of 1892, and the winter so injured blackberries as to make them very scarce, and consequently but few berry plants were planted. Under existing circumstances it is not possible that we will have more than half a crop of strawberries or raspberries next season. Fruit trees of all kinds are in good condition for winter and we are looking forward for a good crop of tree fruits next year.

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The varieties of strawberries that stood the summer's drouth the best are Crescent, Warfield and Haverland. Other varieties made but little growth of plants. Raspberry and blackberry patches made a good growth and are in good condition.

DIRECTORS' REPORT OF FIFTH DISTRICT.

BY JONAS MILLER, WAPELLO.

As spring opened our hearts were made to rejoice when we looked upon the fruit trees full of fruit buds and flowers; even the peach trees, after going through a winter that marked 22° below zero, were full of fruit buds, but a little later we observed that the trees were injured by the cold, which caused the leaves to crumble and drop off, also the fruit. And many trees have disappeared from the ground they once occupied.

The apple trees retained their fruit until insects and fungus diseases attacked them, which caused the fruit to drop off, and what little was left was wormy and scabby and injured by the drought.

There were no cherries except on trees grafted on Morello stock. Trees have done well and held their foliage until frost.

Plums, a good crop, especially Wild Goose, De Soto. Hawkeye, Pottawattamie, Gen. Grant, Kroh, Wyant, Deep River, Wolf, Rollingstone; and where the spray was used, Lombard, Green Gage and Early Red did well.

Grapes, a good crop, especially where properly sprayed.

Pear trees made a good growth, and appeared to be healthy throughout the season, holding their foliage until frost.

Strawberries, a half crop, and the fruit deficient in quality. Varieties planted: Bubach, Jessie, Crescent, Wilson, Haverland, Glendale, Warfield, and some other varieties.

The raspberry and blackberry crops were cut short about one-half, by the drought. Gooseberries, a fair crop. Currants, almost a total failure.

There were but few trees planted in this district within the past few years, and the old orchards are badly neglected. Insects and fungus diseases are apparently on the increase, and unless there are strenuous efforts put forth to rescue our orchards from these destroyers, the future of horticulture looks gloomy to any close observer.

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DIRECTOR'S REPORT OF FIRST DISTRICT.

BY EDWARD HOYT, SCOTCH GROVE.

Our fruit crop the past season has made no one feel very rich. yet we had a fair grape crop, which sold mostly for three cents a pound. When the home supply was gone, grapes were shipped in from New York, which sold at two and one-half to three cents. Some plums bore well; the best were De Soto and Wyant.

Those who are making a specialty of fruit-growing, and are favorably located as to soil and market are doing fairly well. But it is not so with the majority of fruit growers in this district. They have been planting fruit trees and plants for thirty or forty years; and the last two or three years have paid out more for trees than the market value of the fruit grown during the same length of time; and still there are not as many good trees growing as there were ten years ago. Although there are three or four nurseries in the district, it has been overrun by dealers and agents representing more than twenty outside nurseries, who have sold much worthless stuff at high prices. People prefer to patronize agents from a distance who tell wonderful stories and ask extremely high prices. This is an old settled part of the State. Most of the fruit trees are planted in old orchards, or among willows and other old trees, or in sod where no cultivation is given. Neglect, mice and rabbits usually finish them.

Last year a nurseryman in my district sent his catalogue of plants and price list to every farmer and merchant in Jones county. He offered strawberry plants at 75 cents per 100, blackberry plants at 70 cents per 100, roses at $1.25 to $2.00 per dozen. Yet with this liberal offer before them, many farmers were induced to pay a dealer who procured his stock from this same aforesaid nurseryman, $6.00 for two dozen strawberry plants, $6.00 for six blackberry roots and $3.00 for two climbing roses, thus giving the irresponsible traveling fruit agent a profit of over 500 per cent on his small outlay. Do we need any legislation to prevent such swindling? I believe we had better legislate some sense into the people who patronize such dealers.

DISCUSSION.

MR. MONROE: The rule in Jones county is a good orchard on every farm. If there exists in this county such indifference and ignorance as to the usual prices charged for plants, it would be well to send a missionary among them.

MR. PORTERFIELD: As a rule, people rather buy away from home than of their neighbor, though he offers better trees at half the price.

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MR. BRANSON: People near West Branch are at last educated not to buy of agents or dealers. Nurserymen in Iowa can do an honest business and will in the end do much better by it.

MR. HOYT: I am afraid our society has encouraged the shark tree peddler. We don't seem to want to discuss the ways and means of selling nursery stock, whether through agents or by advertising varieties and prices and asking people to come to our grounds and buy direct.

MR. HOOPES: I think it best to employ honest home agents, who do not misrepresent plants or profits.

MR. BURTON: We must employ good, wide-awake, intelligent, responsible agents in order to successfully compete with the unscrupulous, high-priced dealers, who have nothing to lose—not even their reputations—and who sell from the exaggerated attractions of the plate-book.

MR. BRANSON: I have raised Lombard plums for twenty-five years. As to tall trees near an orchard saving the fruit trees from severe shocks of electricity, I think in one year in which we had many heavy thunder storms, two rows of Ben Davis apple trees standing near a row of tall willows, were thus saved and bore good crops.

MR. GRAVES: We seldom get more than one good crop of Lombards from the same tree.

MR. MILLER: With us near Wapello we have a variety that we call Lombard that is productive and good in every way. I know of a pear tree that was an old tree in 1857, and has borne fruit every year since.

PROF. OSBORN: I understand that the Lombard has dark wood, and the fruit is of a blue or purplish color. We cannot decide in one year whether a tree is good or not.

OF WHAT USE ARE HORTICULTURAL SOCIETIES?

BY SAMUEL SPURRIER, SOLON.

While at the World's Fair I had some material proofs of the great advantages of horticultural societies in Iowa, when informed by the commissioner of Iowa's exhibit, that Iowa had 427 different varieties of apples on exhibition—200 more than was shown by any other state in the Union. When looking over those grand displays from Washington, Oregon, Michigan and Arkansas; then standing at the end of an aisle, bordered by Iowa's display, my eyes glancing down those vistas of

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varied colored apples, tastefully and artistically arranged; the air laden with perfume; there bubbled up from my soul to my lips the involuntary expression: "Iowa! sweet Iowa!" the fairest sister of the great northwest. Not that we need 427 varieties of apples in Iowa, for we do not. But in a little over half a century—only three or four times the period necessary to test apple trees to the bearing age—that intelligent and energetic horticulturists should successfully develop so many varieties in so short a time, is a sufficient answer to the question, "Of What Use are Horticultural Societies in Iowa?" And the thunder-like reverberations of that answer ringing from the Horticultural Hall in Chicago, will be heard from Maine to California and from the British possessions to the Gulf. I deeply regret that I cannot be with you at Ames for our three days' meeting. To me it is a great pleasure. It is a feast of reason and a flow of soul. It is an intellectual profit to meet so many courteous gentlemen with such a varied fund of information upon a multiplicity of subjects aside from horticultural, but I must obey the mandates of fate.

PEAR CULTURE IN KEOKUK COUNTY.

BY HENRY SCHROEDER, SIGOURNEY.

A few brief notes on my experience in raising Kieffer pears may be of interest. This variety is generally condemned for culture in Iowa, having been found tender and subject to blight. However, my experience is more favorable. I have a tree planted in 1886, when three feet in height. In 1889 it bore six pears, some weighing three-quarters of a pound; in 1890 about one peck; in 1891 about 200 pears. The past two years a heavy crop set, but the fruit dropped, as did our apples. The tree is now about twenty feet high, healthy and ornamental. I think it has paid for itself. I find the fruit fine for dessert use in November and December, and good for cooking, canning, pickling and drying. It is much better than fruit shipped in from other states, which is usually either rotten or too green.

The pear is at home in my native country, Germany, where the fruit is as plenty as the apple, and some of the trees over a century old and superior in height and diameter of trunk to apple trees. The air is more moist and equable. But these varieties fail in our dry interior climate. Blight is the worst enemy of the pear.

DISCUSSION.

PROF. PAMMEL: What is the history of that old pear tree in Des Moines county that Mr. Miller spoke of?

MR. MILLER: Rev. Daniel Cartwright brought this tree west about 1838. I saw it last fall and it had some pears on then. It ripens in August and the fruit is of medium size.

MR. MILLER: There was no blight this year. In my opinion, if the ground around the roots of a tree is well underdrained, it will not

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blight. The pear must have dry feet. I know a few pear trees standing on a sandy knoll that bear nearly every year and are vigorous and green and do not blight, and yet there is much water about three feet beneath the surface.

MR. BRANSON: In my experience, the pear on pear roots does not readily blight.

PROF. HANSEN: Mr. B. A. Mathews, of Knoxville, urges that pears should be planted on the highest land without shelter; that every branch that shows blight should be cut off immediately; that the trees should be mulched and not cultivated too much.

PROF. PAMMEL: I think in Texas the Transcendent crab never blights. The blighted branches should never be carried near other trees, and care should be used in using a knife first on blighted and then on sound trees.

THE FORESTRY PROBLEM.

BY G. P. MILLER, DES MOINES.

The subject of forestry is one which for many years has attracted attention in Europe, where its importance is generally conceded, but in this country less attention has been paid to it. We have been as extravagant and wasteful with our forests as with the many other gifts with which nature has endowed us. The advantages to be gained from the planting of forests may be considered under two heads; first, those which accrue to the owner of the forest alone, and, second, improvement of climate, which equally benefits one's neighbors.

Some advocates of forestry assert that here in Iowa it would be profitable to plant forests on tillable ground. They argue that many of the valuable woods are becoming scarce and will soon be higher in price and that a planted forest has many advantages over a natural one in that only useful kinds may be planted and that the conditions may be so regulated as to produce the best quality of lumber.

Yet our meager experience and the practical sense of most farmers seems to contradict this view. The Illinois experiment station has made a quite extended line of experiments in tree planting, beginning in 1871, and the planting continued from time to time. The trees grew fairly well, but as a financial venture it was far from profitable. This accords with the fact that forest lands sell for less than prairie or tilled lands in similar situations, the trees, even when already grown, not paying for clearing and stump pulling. A planted forest of the same age would be more valuable, but not enough more to be profitable. To plant for fuel will certainly not

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pay in Iowa, with coal at its present price, although it might pay further west. The exhaustion of the coal field is too far distant to invest money upon now.

For various manufacturing purposes the price of special varieties is higher, but it may be had much cheaper from the west, the north, Canada and the south than we can produce it on our fertile farms, and so long as their land is worth less than ours, so long can they produce it cheaper. Even if the supply of wood is greatly reduced, the price will not rise indefinitely, for it must always compete with iron and steel, which, as manufacturing processes are improved, must get cheaper.

For certain domestic purposes, as shelter belts around houses and grounds, the advisability of planting trees is generally acknowledged, and it would pay farmers not having timber to plant a small grove of the best varities for fence posts. But though it may pay to plant for these uses, the planting of large commercial forests is a very risky venture, depending almost entirely on the assumption that the price of wood will rise greatly in the comparatively near future. It is also an investment that, because the returns are long delayed, is not inviting to capital.

If forests are planted, everything should be made as favorable as possible. The expense may be reduced by planting on the least valuable ground, either rough or low bottom land, subject to overflow. This would reduce rent, one of the chief items of expense, and as the trees have to be cultivated but a few years, land could be used that would wash too much if put in regular crops. The returns should be made as large as possible by planting only the very best varieties. The expense of planting, tending, and rent would be almost the same for all, but the difference in value of the timber would determine the profit or loss. Experiment carried on with a view to determining the hardiness, rate of growth, adaptability to soil and climate, and timber-value of various kinds of trees, are therefore very important.

Although in Iowa there is little waste land, yet we have some ground that is not suited for tillage. Much of this is the flood-plains of creeks and rivers and the adjoining bluffs, and is already in timber. These forests should not be cut down, but their value should be increased by trimming out the worthless kinds, and leaving the young trees of those varieties which will prove of value. In this way natural forests may be made nearly as valuable as planted ones, and they will be just as useful in bringing about climatic advantages.

For though forests may not be profitable to the individual owning them, they may be so to the community at large, on account of the effect on climate. The principal advantages claimed for forests are that they make the rainfall greater and more regular, and that forests on mountain sides arrest the flow of water after heavy rains, thus lessening floods in rivers, and giving, instead of alternating torrents and dry beds, continuous streams. This last argument does not apply so strongly to a level state like Iowa, although even here water will run off much faster from bare or tilled ground than from forest land, and will also wash off more of the soil.

In regard to rainfall, forests have been found to increase the relative, though not the absolute humidity of the air; *i. e.*, they decrease the temperature, thus making it easier for it to rain.

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Iowa suffers not so much from lack of moisture as from irregularity of precipitation, drouth being often almost unbroken for several months; and if the forests would obviate this difficulty, they would be of great value. But whether the crop saved from the drouth would be sufficient to offset the loss from less acreage, is a question hard to determine. At least we cannot expect a man to plant his farm to an unprofitable forest in order to make it rain on his neighbor's land, nor to protect those southeast of him from blizzards. If anything is done in the way of planting large forests, it must be done by the government, and the forests must be maintained by public funds.

This is really the province of the general government, for the forests planted in one state would often prove of benefit in others; for example, forest planting in Dakota would shelter us somewhat from blizzards. If forest planting is left to the states, those will plant first who have large irrigation interests, or much waste land, or whose climate is much more arid than ours—like the states of the great plains. New York expects pecuniary as well as climatic advantage from her forests; but the land was the otherwise worthless Adirondack region.

The place where the necessity of planting forests is most universally conceded is on mountains, the streams from which are used for irrigation. It has been found by sad experience that when the forests are cut off the rains, instead of soaking into the ground and being given off gradually by springs, run immediately off the bare rocks in raging torrents, and when water is most needed the streams will be dry. In many places the cutting off of forests has so decreased the supply of water that irrigation systems had to be abandoned, and the country dependent upon them became barren. In states so situated, forestry is receiving much attention.

Under the present wasteful system of managing the government forests, there is almost no practical restriction on the cutting down of trees. The government sells its timber land at $2.50 per acre, which is often not one-tenth of its real value. The stealing of timber from government land has always been a renumerative occupation, and until recently there has been no effort to restrict the cutting of timber for climatic reasons.

But during President Harrison's administration, by virtue of power recently conferred by congress, the President, by proclamation, reserved sixteen timber tracts aggregating about three hundred thousand square miles from entry, making of them forest reserves. These are all in the Rocky or coast mountain region, besides a large reserve in Alaska. One is near the Yellowstone National Park, one extends along the Sierra Nevada for many miles south of the Yosemite Valley, one is near the Grand Canon of Colorado. Nearly all of them contain fine scenery, well worth preserving for its own value; and many of them overlook important irrigation basins. This is a step toward filling one of the most important needs of forest legislation, but there are many other tracts which should also be reserved. And even in these reserves there is no adequate protection against forest fires, which destroy more timber annually than we use, and in the other government timber there is no fire protection at all. It is folly to talk about the government planting trees before it will even take care of those it has.

These forest lands do not usually spring up to valuable timber again

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after being cut or burned off. Either the ground remains barren or worthless sorts grow, so that the land which, if properly treated, might supply us with timber indefinitely, becomes worthless. It is therefore of the utmost immediate importance to pass laws which will give our forests adequate protection against the rapacity of the wood chopper and the greedy forest fire. This done, if trees are planted on waste ground where profitable, or where needed for climatic reasons, we will have no reason to fear a wood famine.

On motion of the society, the President appointed A. Branson and D. A. Porterfield delegates to the Northeastern and State societies to confer as to boundaries of Southeastern district.

The President appointed the following committees:

Election of Officers and place of Meeting.—Dr. J. I. Bailey, A. J. Graves, Prof. L. H. Pammel.

Resolutions.—W. Green, W. H. Hoopes, Prof. H. Osborn.

Revision of Fruit List.—H. W. Lathrop, C. L. Watrous, Henry Schroeder.

Premiums.—Mrs. Sarah K. Wilson, Jonas Miller, D. F. Bruner.

TUESDAY EVENING.

Parley Sheldon, Mayor of Ames, delivered a very cordial address of welcome, expressing pleasure on behalf of the people of the city for the honor conferred by the society in meeting with them.

RESPONSE TO ADDRESS OF WELCOME.

BY H. W. LATHROP, IOWA CITY.

On behalf of the members of the Southeastern Horticultural Society, I tender you their most hearty and sincere thanks for the cordial welcome you have extended to them, and with which you have greeted them.

In welcoming us to your fair city, it is very pertinent you should ask who we are; what we have done, what we propose to do, and why we have met here. Answering these queries, I have to say that we are the oldest horticultural society in the State, including in its membership many of the veterans in fruit growing, as well as many younger recruits who have enlisted in the cause of intelligent and progressive

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fruit culture. We come up to our annual meetings each laden with his richest experience and ripest thoughts on the subjects of fruit, flower and tree culture, and return home laden with the accumulated experience and knowledge of all. Our society is one of the people's colleges in which every member is a professor and also a student. We impart instruction to, and receive it from each other.

A review of the last quarter of a century's history of horticulture shows what we have accomplished and that history is a promise of what our future will be. From the little wild strawberry that grew in the grass of our prairies, we have made an advancement until, by cross-fertilization and proper cultivation, we have produced berries that almost equal hen's eggs in size and of a most delicious flavor.

From the sour Clinton, which was about the only grape that we thought we could raise, we now have a long list led by Concord and followed and flanked by such varieties as Worden, Moore's Early, Niagara, Agawam, Pocklington, and others too numerous to mention, of hardy character as to vine, and flavors and sweetness that will please the taste of the most exacting.

From our list of apples we have discarded those varieties like Red June, Gilpin, W. W. Pearmain, and others that have proven unprofitable and supplied their places with better and more desirable sorts. In searching for the best, whether seedling or foreign production, our motto has been, "Prove all things and hold fast that which is good."

We have even demonstrated that the peach can have a place in our list of fruits, and that it can be safely and profitably grown.

It is quite fitting that our meeting should be held at Ames, almost under the shadows of your Agricultural College, for the late Suel Foster, who was a charter and life member of our own society, was one of the fathers of the college, was its most steadfast and zealous friend when it was most in need of friends, and did as much as any one to establish and build it up.

Again, Mr. Mayor, for our society, I thank you for the kind welcome with which you have received us.

THE DESTRUCTION OF NATURAL VEGETATION FAVORS THE DEVELOPMENT OF FUNGUS DISEASES.

BY J. J. EDGERTON, AMES.

Man in his haste for selfish gain,
  Mars nature's garb with ruthless hand;
And thus, unknowingly, perhaps,
  Spreads desolation o'er the land.

Guard then, O Man! thy thoughtless acts:
  In clothing earth with tree, herb, flower and vine,
For thy best needs nature has done her part,
  Do thou but thine.

The study of the book of nature is as interesting and varied as it is inexhaustible. One of the most beautiful laws to be found there is the law of equilibrium. If we step out into a section untouched by the hand of man,

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we will find those plants and animals that are adapted to the surrounding conditions. In all directions will appear witnesses of a struggle for existence, and the survival of the fittest is the result.

The individuals of one division struggling with each other for nourishment, those of one division preying upon those of another; and in turn being devoured by those of still another section, and so on; the tendency of each to hold the other in check, combined with the peculiar climatic conditions of that particular section of country, maintain the balance of power. Remove any one of these divisions from this environment and you will have abnormal development. As when the Red clover plant was transported to Australia, not having the bumble bee present to pollinate it, it did not set seed. The bee was then imported. This remedied the clover seed trouble, but as they did not import the parasite that worked on the bee they soon had a superabundance of bees. Our plants are taken from Iowa to England and *vice versa;* many of them will not develop seed and frequently perish in a few years.

A case from the animal kingdom may be cited where the New Englanders, a few years ago, offered a bounty on bird scalps, as a protection to their fruit, and in a short time their fruit crops were destroyed by insects.

Thus it is in opening up any new country. The plants are either removed from their environment or have their environment removed from them. The natural conditions are broken up and some unnatural development results. In the primitive state the land is covered with some kind of vegetation that holds the surface water, the constant evaporation of which tends to equalize the temperature and greatly modifies the climatic extremes.

Man steps in, fells the forests, breaks the prairies, drains the marshes and cuts from off broad sloughs and river bottoms the dense growth of tall rank grass, leaving the earth so bare and smooth that any precipitation is immediately drained off into the waterways and goes on its way to the ocean, while the ground is left in the burning rays of the sun dry and scorched until another rain. Thus, instead of an equable climate, we have one of alternate floods and drouths, sudden and extreme changes in temperature till the economic plants that have been developed naturally under such conditions are about as often to be met with as polar bears on the plains of Mexico. Consequently, the plants are injured more or less in vitality, rendering them more susceptible to maladies of any sort. The tissues are more or less injured, allowing the fungi to penetrate them more readily. The plants not being vigorous enough to resist the attacks are compelled to yield to their enemies. Every year the list of fungus diseases lengthens, and the field of their destruction broadens. Plants that formerly enjoyed comparative immunity from disease, now wither their leaves and drop their fruit. Ever since the various fungi have been increased to an abnormal quantity, those plants growing in or near the timber under nearer natural conditions are much more free from fungus attacks than the same varieties out in an isolated condition. It has frequently been demonstrated that by proper mulching, the local temperature being rendered more even thereby, the ravages of the fungi may be much lessened. The essential point in this connection is to maintain as nearly as possible the natural conditions in the midst of which the plant has been developed, so as to produce a sound healthy growth with no weak spots at which the fungi may enter.

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A NEW ERA IN IOWA PLUM CULTURE.

BY DR. A. B. DENNIS, CEDAR RAPIDS.

The widespread interest in the production of new and better varieties of our native plums the past few years has given us some of great value, and is rapidly stimulating some of our best horticulturists to still further develop these hardy and prolific fruits, and I believe we are entering a new era in plum culture in Iowa. This splendid native fruit warrants special study and development, for in them lie great possibilities. The fruiting of a few varieties of these new and improved native plums, convinces me that commercial orchards set to the best varieties that can even now be selected, will yield larger profits in our Iowa orchards than any other fruit we can cultivate. If this be true of the few really valuable sorts available at this time, when so little has been done to elevate this magnificent fruit to the head of the lists of orchard productions, who can predict what the future plum industry will be after a widespread interest has been aroused, with new varieties of larger size and better quality, and we have broken up that old and pernicious habit of our retail dealers that insist our fine improved natives must be marketed in wash tubs and bushel baskets. We should plant none but first-class varieties, and when in fruitage refuse to sell at any price to dealers that insist that our fine commercial plums must be classed in our markets with our degenerated natives that may still exist in the half dead plum thickets that here and there bear fruit of inferior quality and size, as a sad reminder of the once prolific wild groves so plentiful all over Iowa thirty years ago.

We should select and plant varieties so as to give us the longest possible season of fruitage. This is best done by planting extremely early and late varieties, and fill in with medium sorts; in this last class we have some extremely fine sorts to select from, but the early and late are not so easy to supply. On my ground I have over one thousand trees, and over fifty varieties of natives on trial. Their season so far as fruited runs from July to October. I hope to add new varieties so as to lengthen the fruiting season a few weeks, earlier and later. My extremely early varieties are Milton, Wild Goose, Cheney, Chas. Downing; medium are Wyant, Hawkeye, Stoddard, New Ulm, Comfort, Illinois Ironclad, etc.; late, Ocheeda, Miner, Golden Beauty, Honey Drop and Champion. The fruit of Ocheeda and Hammer are the finest in quality of the fifty varieties on my ground, and I think but few domestic plums excel these two natives in quality.

Japan Plums.—Of these fine and splendid plums, I wish to state my experience is limited, but so far as tested on my ground they far exceed my

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expectations, and I believe this is true in all parts of the United States where they have been tested. No fruit of recent introduction is meeting the expectations of fruit-growers throughout the entire country equal to these oriental plums; their high quality, size of fruit, smallness of pit, earliness in bearing, great productiveness, handsome color, freedom from insect pests, long keeping and shipping qualities make them just the plums to recommend as fit companions for our finest natives, and I predict that the cross-bred seedlings of these oriental and our natives, will in the near future make Iowa one of the best plum States east of the Rocky mountain region, but this will not be done without hard labor and expensive biological work by the combination of the life forces of these two hardy fruits. In order to create these new varieties they must come through the realm of cross-fertilization. We are standing face to face with a new and more scientific pomology than the most profound student can fully realize. We have taken but few steps in the direction of permanent success in the higher development of plum culture in our State. We must become practical students of the conditions that surround us, and use our native fruits as a basic structure to build on, and gain by practical demonstration a knowledge of how to combine the life forces of our native plants with those of foreign blood that possess all those inherent qualities ours lack, and are so closely allied that links can be found to make a complete chain, and fill the gap that now exists between our native fruits and foreign introductions. These Japanese plums so far on my ground have been a surprise to me, especially their power to endure a low temperature, having stood 26° below zero without a tinge of frost, but remained healthy to the terminal bud, and the past season the Burbank and Ogon bore a heavy crop for such young trees, and these same trees that bore so heavily this year are extremely full of fruit buds for the crop next year. This indicates great productiveness in these plums, and they bid fair to be heavy annual bearers. Just why these fruits from their far off island home in the Pacific ocean with a mild and genial climate, should have such power of endurance in our cold continental climate, one thousand miles from ocean influences that they have been surrounded with, has been a great puzzle to me. By watching them side by side with our hardy natives the past four years, and witnessing their splendid behavior, I have been forced to the conclusion that there is a close relationship between our natives and these Japanese introductions, and that in the preglacial climate they had a common origin in North America in the region of Greenland and Alaska, when that section of the globe was blessed with a climate more temperate even than ours, or it may be possible in the great prehistoric past, geological convulsions destroyed their former continental home in the Pacific ocean, that at that time may have been connected with North America in the far northwest. Their habits and growth are so much more in harmony with our natives than those from Europe that I am sure at one time ancient America and Japan were closely connected, and either the ancient Japan climate was more in harmony with our present diversified climate, or these plums had a common origin in North America. Such hardy Chickasaws sa Golden Beauty, Honey Drop, Chas. Downing, Col. Wilder, Wild Goose; also Miner, Robinson and Hammer, are a few of our natives that are connecting links that chain our native plums to some of these oriental sorts, like Burbank, Ogon, Yellow Japan, etc. The points of similarity noted are early

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shedding of leaves, maturity of wood, multiple leaf buds, roughness and color of bark, and fibrous condition of the inside skin of the fruit. There doubtless are many more points of resemblance that will reveal themselves as we further investigate and compare them more closely with our natives. We must not expect too marked a resemblance for they have been separated for thousands of years, and the conditions that have surrounded them were so radically different that it has almost blotted out their connection; when we realize that these orientals became surrounded with a genial climate and show the influence of a high civilization for unknown ages, while our natives had to struggle against a relentless warfare of elements in climate, savage beasts, and a savage and destructive humanity, the only wonder seems to me is that we can find a trace of their common origin and relationship. I have expressed my views to some of our pomologists and will give brief extracts from a few of their letters bearing on the subject.

P. J. Berckmans, of Augusta, Georgia, says: "Your idea of a connecting link of the flora of Japan with that of the North American continent, coincides with what my dear old friend, the late Prof. Asa Gray, once told me—that he found a wonderful similarity between some of the plants of the United States with their congeners from Japan—which made the study o the latter so very interesting to him. You modestly term yours a *wild idea*. Permit me to say that it is far from such, and really in your letter you but substantiate *facts*."

Prof. L. H. Bailey, of Cornell University, New York, says: "I am much interested in your letter upon the Japanese plums. The fruits of the United States and Japan are really very closely related. The two countries were once connected at the northwest, and the floras of both originated far north, and were driven southwards by changes in external conditions."

Prof. G. Goodale, of Harvard University, Cambridge, Massachusetts, says: "You will find in the article Sequoia, in Dr. Asa Gray's Darwiniana, an account of his views in regard to the relation existing between the vegetation of Japan and parts of the United States. It is very interesting to know that you have, independently by your study of plums, arrived at the same conclusion as to many points."

W. A. Taylor, Assistant Pomologist, United States Department of Agriculture, says: "In regard to the Japan fruits about which you write, I am glad to receive your report concerning them. Your conclusion that they must have been native in a more severe climate than that of Japan is no doubt a correct one."

Prof. C. S. Sargent, who has devoted much time to the investigation of Japan trees, and who spent the summer in Japan this year, states that he finds "no wild representatives of the species to which the cultivated Japanese plums belong."

In closing permit me to say that if my conclusions on the affinity of these fine Japanese and our native plums are true, it opens up a new era in plum culture, for here we have introduced a fine fruit that doubtless is related to some of our hardy Chickasaws and other natives. In their large size and fine qualities lie the condensed improvements brought about by the scientific combination of the life forces of these oriental plums, so really to the Japanese horticulturist we owe much, for we at once can avail ourselves of these wonderful fruits it has taken perhaps thousands of years for him to-

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develop, while our natives were left to nature to improve them under the law, "the survival of the fittest." By cross-breeding our natives with these fine orientals, we gain these long ages of improvement made by our Japanese horticulturists. Already a vast amount of work has been done in this direction by J. L. Normand, of Markesville, Louisiana, who has produced hundreds of new seedlings which are crossed with our natives, and many of them are said to be fine. I look forward with great interest for wonderful results on my ground from these cross-bred seedlings. There is yet a wide realm lying between the American and Japan floras, a field almost entirely unexplored. My conclusions expressed in this paper on a connecting link between these Japan plums and the flora of ancient America is the introduction to one of the most important fields of pomology yet unexplored, and I trust my feeble efforts and limited experiments may induce some of our pomologists of means and intellect to explore this wide field. I am willing that my ideas should receive all that severe criticism can possibly bestow, for if true, I am not concerned about their *reception* or *rejection*, and if there are those that wish to combat them, they are welcome to the fruits of their victory, and if they present better reasons for the splendid behavior of these Japanese plums with us, I am willing to accept them and pull down all the theoretical platform erected in this paper. I am certain if further and more extensive experiments and tests are made with these Japan plums it will not alone greatly enlarge the boundaries of the science of pomology, but increase our list and acreage of fine commercial plums in Iowa.

DISCUSSION.

PROF. PAMMEL: There is a remarkable similarity between the flora of North America and eastern Asia. Plants from China, as a rule, do well in eastern North America.

MR. WATROUS: I think we all owe Dr. Dennis a debt. There is not another man in the West who has brought together so many native plums. We have for a quarter of a century been bringing different varieties of plums from Europe, but I do not think a single specimen has been a success. Some pomologists have tried to discourage any attempts at bettering our native plums; but it seems to me that reflection must convince any one that there is no limit to the improvement of this fruit as to taste, size, thinness of skin and all other good qualities. The Japanese plums have astonished me as to the similarity between them and our native plums. The young shoots, and particularly the leaves, are almost exactly alike. The leaves of the Miner and Burbank are the same as to size, shape and thickness of texture as the Japanese; then the buds are exactly alike. I should advise planting the best Japan plums beside our best natives and let them cross. We ought to expect good results from planting these seeds.

DR. DENNIS: I have brought here a few twigs of different varieties of Chickasaw plums, and among them a couple of twigs from

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Japan tree, and I wish you experts to pick out the latter [several made selections]. You have all failed but one, who has picked out one Japan twig.

WEDNESDAY FORENOON.

SECRETARY'S REPORT.

This society has much encouragement from the fact that its membership from year to year is rapidly increasing, and its influence and usefulness widely extending through all the counties comprising its territory. The papers read and discussed at its meetings by practical men and women, are printed each year in a convenient form by the State, and are considered standard text-books for the guidance of the inexperienced in the growing of fruits. By studying these books one can prepare himself for the business of fruit raising, and avoid the mistakes made by theoretical horticulturists in their early experimental work. These annual gatherings are schools in which each is both teacher and pupil, and though there is often much difference in opinion among the members as to the comparative merits of different varieties and the best modes of culture, there is substantial agreement upon the questions, what, how and when to plant, how to cultivate, to trim, to graft, to protect, to market the crops, and how to perform all the details of the business.

In the early years of this society, our State was an untried field and the problem before us was, what variety of fruits worthy of cultivation will prove hardy and yield abundantly in our varying soil and climate? Thousands of enthusiastic men engaged in the solution of this problem, mostly by transplanting favorite varieties at much labor and expense, from their former eastern homes. The results which followed are well known. Nearly all of these costly trees died the first season, and those that survived had only a feeble existence for a few years more. Failures and discouragements were everywhere, and the unanimous verdict published to the world was, you cannot raise fruit in Iowa. But a few determined horticulturists, among them the founders of our State and district societies, were unwilling to give up the fight. They continued the battle until, finally, in this Columbian year, victory rested upon their banners at nearly every point along an extended line. It is unnecessary to record here, the history of this struggle. The most promising native varieties, selected from the northwestern forests, were crossed and re-crossed with those brought from other countries, until to-day, a large number of new, hardy and productive varieties make up our Iowa list.

It is well to rejoice over our final success, but we have now another problem staring us in the face, which must be satisfactorily solved, or our

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victory is almost a barren one. Most small fruits must be in the hands of the consumer within twelve hours after they are fully ripe. If the producer ships them to a distant city, the railroad and commission men often absorb the entire receipts. He is, therefore, compelled to carry his fruit with his own conveyance to the nearest market, and peddle it out on the street, quart by quart and basket by basket, in competition with neighboring growers. The result is, that in years of plenty, as in the last season with grapes, the supply is much larger than the demand, and the prices go down far below the cost of production. As this state of things is the rule every season with one or more kinds of fruit, the growers are becoming discouraged at the outlook, and are turning their attention to other than their chosen work. Cannot our society devise some remedy for this evil? Perhaps an organization or union, through which the fruit-grower may receive every year a reasonable or fair remuneration for his labor?

Grape unions are already in successful operation along the southern shore of Lake Erie, and through them many thousand carloads of grapes are shipped yearly to all parts of the United States, at prices which return to the grower a larger profit per acre than can be realized from any other crop. Whether it is feasible to attempt to form such unions in Iowa for other fruits more perishable than grapes, or whether it is better to form companies at our fruit centers for the purpose of providing cold storage, or canning, or otherwise preserving our surplus fruit, is in my judgment a question for this society to earnestly discuss. For until some such scheme is put into successful operation, there is but little encouragement for the extensive fruit-grower.

These meetings are partly supported by the State with the object of furnishing instruction at little cost for the growing of fruits, flowers and vegetables. Is it idle to hope that this society may in its wisdom devise some plan by which a larger attendance may be secured and the greatest possible good accomplished?

TREASURER'S REPORT.

STATEMENT OF RECEIPTS AND DISBURSEMENTS FOR 1893.

RECEIPTS.

1893.		
Jan. 1.	Cash, balance on hand	$ 158.12
Jan. 5.	One membership fee	1.00
Dec. 7.	Appropriation from State Society	150.00
Dec. 7.	Interest	6.00
Dec. 7.	Annual membership	28.00
	Total	$ 343.12
	Disbursements	175.79
	Balance paid to new treasurer	$ 167.33

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DISBURSEMENTS.

Dec. 7.	Expenses Miss Nichols	$ 3.40
Dec. 7.	N. E. Hansen, printing and telegrams	2 55
Dec. 7.	Premiums on fruits, etc	22.25
Dec. 7.	Expenses secretary's office—printing, postage, etc	16.10
Dec. 7.	Salary secretary	50.00
Dec. 7.	Expenses officers attending meeting	81.49
	Total	$ 175.79

Both of the foregoing reports were received and adopted.

DISCUSSION.

MR. LATHROP: Although Iowa can raise enough grapes for herself and for her neighbors, yet the fact is we buy this fruit mostly from the east. In places where there are unions the grapes are shipped under one head, who is in communication with all parts of the United States.

MR. HOOPES: I have been in the fruit business for eighteen years. At first there was a good market all over Iowa, but lately every locality absorbs its own fruits. By encouraging the general planting of orchards we have killed our own business of shipping. Strawberries are usually too tender to permit being carried any great distance. We are left with but one hope—that of supplying those north of us whose fruit is not yet ripe. I think our grapes are not as long keepers as the New York grapes. The skin is perhaps too thin, and we do not handle them as well. They ought to be allowed to wilt and all crushed grapes picked off before packing. We do not usually do this, but pick them all in the same basket and sell immediately. I am inclined to think that when we get a grape that will keep longer and yet be equally as good as the Concord, and also learn to handle them, we can compete with any foreign grapes.

MR. WATROUS: There is one way out of the trouble. We can raise such grapes as Pocklington and Agawam as well as they can in the east, and we had better try these and other choice kinds. My observation at the World's Fair was that cold storage will preserve our fruits so that they will present a fine appearance for a long time, and will come out brighter and fresher and drier than at first. By keeping our fruit for several days in a dry, cold air, until it is thoroughly dried, it can then be packed and sold at good prices.

MR. BRANSON: The best way I have found is to put my apples on shelves in a cold, dry cellar for several days and then pack. Apples kept in cold storage will often soon turn black when brought out. But perhaps they were kept too cold and too moist.

MR. WATROUS: Apples should always be kept at the same dry, cool temperature.

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MR. Watrous offered the following resolution, which was adopted:

Resolved, That this society is gratified by the results obtained by Dr. Dennis in the cultivation of various kinds of plums from Europe, Japan and the United States and that this line of work deserves every encouragement.

DR. DENNIS: I have not the time to devote to horticulture and I do not advise the planting of Japanese plums very extensively, until more experience has been had. But I think we should watch carefully the development of not only the Japanese but especially our native plums, and cross them with the best wherever found. We are inclined to overlook some very excellent varieties.

MR. PORTERFIELD: The New York grapes are not sent to market until after great care in sorting, picking and packing. Every bunch should be examined and the half ripe, crushed and rotten grapes picked off.

MR. HOOPES: As to commission men, I once thought that they were, without exception, the most complete set of rascals that ever lived, but I have changed my mind; I now believe them to be as honest and will stand as good a chance to get to heaven as those engaged in any other business. The trouble is with ourselves. We must put up our stock in better order and send to market in good well ventilated cars.

THE LIFE HISTORY OF A COMMON PLANT LOUSE (*Aphis rumicis*, L.

BY F. ATWOOD SIRRINE, M. SC., AMES.

It was my intention to be able to give the society the life history of the louse that curls the leaves of the Snowball. Instead I shall give the life history of the louse, called by some authors, *Aphis euonymi*, that infests the Burning-Bush or Euonymus, sometimes called Strawberry-bush and Waahoo.

Many of you have undoubtedly observed the sudden disappearance of plant lice in late spring and the equally sudden re-appearance in the fall.

In order to be able to use means to check their increase in such numbers, it is well for horticulturists and farmers to know what becomes of the little pests during the midsummer.

Though it has been surmised by entomologists that many of the species of plant lice migrate from one kind of plant to another during part of the season, but few species have been proved to have this habit. The Snowball and Euonymus louse both have this habit of migrating. The history of the first is not complete. That of the Euonymus louse is as follows: The eggs, which are deposited around the buds of euonymus, hatch between the mid-

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dle of April and the first of May. All the brood from the eggs are wingless. After moulting two or three times each individual, all being females, begins to deposit young plant lice like themselves on the under side of the leaves, which the stem-mothers have caused to curl slightly. When full grown the second brood develop wings and migrate to such weeds as shepherd's purse, curled dock, pigweed and thistle. This migration occurs between May 20th and June 10th. They remain on these weeds throughout the summer. The number of broods produced during the summer on the weeds is not known. In this locality they seem to prefer the pigweed (*Chenopodium album*). Feeding as they do on the flower spikes, they resemble the seeds of the weeds, and are easily overlooked.

The latter part of August another brood of winged females appear on the pigweed. These migrate back to the euonymus, on the leaves of which a wingless brood is deposited. This wingless brood is the last of the season. About the time the latter are deposited on the euonymus, a brood of males is deposited on the pigweed, which develop wings, migrate to the euonymus and pair with the wingless females, after which the females deposit their eggs around the buds to pass the winter.

This in brief is the life cycle of this aphid. The migrations were observed in the field and proven by artificial transfers. It was suspected from the mixed up descriptions of *Aphis rumicis*, as the louse on pigweed and shepherd's purse is called (known also by the common name of "Black Dolphin" and "Bean Louse") that *Aphis euonymi* (the one occurring on euonymus) and *Aphis viburni* (the snowball louse) might be related. Besides, Dr. Thomas[1], quoting from Walker, gives *Aphis euonymi* as a synonym of *Aphis rumicis*, but does not mention that they migrate from the euonymus to rumex. During the spring of 1892, a louse was found in the flower clusters of the snowball, which resembled the euonymus louse and bean louse descriptions. As Buckton[2] states that *Aphis Viburni* infests the flower-clusters, the natural supposition was that it must be the snowball louse. With the intention of proving the latter, and at the same time determining the life history of the snowball louse, as already stated, transfers of *Aphis euonymi* were made from euonymus to the snowball May 17th and covered with netting. At the same time search was made for *Aphis rumicis* on such weeds as they were known to infest, but none could be found. Nor was any plant louse found on these weeds, with the exception of a root form on shepherd's purse till June 2. In the meantime the *Aphis euonymi* transferred to the snowball thrived and worked principally in the flower-clusters. At the same time another species, which agreed with some of the descriptions of the snowball louse, could be found working on no part save the curled leaves.

On May 23d and 25th winged specimens of the louse, transferred from the euonymus to the snowball, were transferred to shepherd's purse, curled dock and to beans, which had been potted, covered, and kept in greenhouse for this purpose. The louse infesting leaves of the snowball was treated in the same way, but it refused to colonize on any of the plants named and died, while the euonymus louse thrived and increased in such

[1]Thomas 3d Report of the Insects of Ill., p. 88.

[2]Monograph of British Aphids, Buck., vol. II, p. 79.

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numbers on the shepherd's purse as to kill the plant. It did not do so well on the dock in confinement, and all perished on the bean.

Pupæ of *Aphis rumicis* were found on pigweed, about the middle of September, taken into the laboratory and confined. When the latter developed wings, they were transferred to covered branches of euonymus. Here they deposited the last brood of wingless females. As soon as the males could be obtained, they were transferred to the nets on euonymus which contained the wingless females. By October 12th eggs were found around the buds of the covered branches.

The following conclusions can be made on the work as done:

First—That *Aphis rumicis* and *Aphis euonymi* are one and the same.*

Second—That this aphis has a true migration twice a year; first from euonymus to annual weeds from May 23d to June 10th; and second, back again to euonymus from September 15th to October 15th to deposit their eggs around the buds.

Third—That it can live and feed on the snowball. In fact, quite a number of colonies, being deposited by late migrations, were observed the present fall on snowball leaves. They were apparently deposited after all the leaves of the euonymus had fallen. This habit of also migrating to the snowball and infesting flower clusters, as proven, accounts for the confusing descriptions of *Aphis rumicis* and *Aphis viburni*. In fact, what has been supposed to be *Aphis viburni* has not been found any place except in the curled leaves of the snowball and the black haw (*Viburnum lentago*). The most characteristic difference between the two species is to be seen in the larval forms, those of the euonymus louse being an olive brown color, while those of the snowball louse are greenish white.

Fourth—That *Aphis viburni* does not migrate to such weeds as shepherd's purse and dock; though by June 15th all had left the snowball leaves and were not seen again till the latter part of October.

Remedies.—From the fact that both species of these plant lice cause the leaves of the plants on which they feed to curl to a certain extent, it is difficult to exterminate them by spraying with kerosene emulsion; yet they can be kept in check by persistent spraying with weak solutions of the emulsions (about fifteen parts water to one part of Riley-Hubbard emulsion[3]). It seems best in making the emulsion to use a little excess of soap, thus avoiding any free kerosene, which may result from poor quality of soap, or lack of machinery to make a perfect emulsion. When the "Black Dolphin" infests the snowball, it is easier to destroy it by emulsion than the snowball aphis, as it does not curl the leaves to such an extent as the latter, and usually infests the flower clusters. The spraying should be done in the spring; there is no use spraying in the fall, as the migrations extend over nearly a month's time; besides, the aphids do but little feeding after the fall migration; furthermore, numbers of their natural enemies would be destroyed by the emulsion if sprayed in the fall. Since it is known that the Euonymus aphis migrates to weeds during the summer, a good remedy

* Since writing this article I find that some observations made by Dr. Fitch (Thirteenth Report on Noxious, Beneficial and Other Insects of the State of N. Y. 1869, p. 495), were overlooked. Although he did not seem to realize that they had a fixed habit of migrating, his observations help to prove that the two species are identical.

3. Riley-Hubbard formula for emulsion: One-half pound of soap dissolved in one gallon of boiling water, then add two gallons of kerosene and emulsify.

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would be to allow no weed patches in fence corners. If weeds grow where they cannot well be destroyed by plowing, spraying with a strong emulsion would prove effectual. No better remedy than kerosene emulsion can be given for the snowball louse (*Aphis viburni*), till its life history is complete.

HORTICULTURAL ECONOMY.

BY L. O. WILLIAMS, COUNCIL BLUFFS.

In these days of "hard times" and financial panics throughout the business world, the question of *economy* may be appropriately considered as one of the essential elements to success in our profession as horticulturists.

If "*economy is wealth*" (and most of us are agreed that it is), there is no necessity for urging upon my readers the importance of its consideration.

I do not propose in this paper to show how we may redeem any loss or recover any fortune that we may have lost during the past trying season, but I wish merely to point out some lines in which we may follow with less fear of financial loss.

I will first consider that subject which will naturally come first before the beginner in fruit growing—that of selecting a location. The question of the price of land appeals quite strongly to the beginner who has but little if any money to invest in its purchase at the start, but we should not forget that many of the "bargains" offered in real estate may be dearer as a gift n the end than other offers which seem to us at the time as extravagant and unreasonable.

Take for example some of our Iowa farmers who have left good lands that could be bought for $25.00 to $50.00 per acre, to go out to the new and undeveloped lands that our government has offered them as a gift—most of you are very familiar with many unfavorable results of such an exchange.

In fruit growing for a livelihood, the importance of a location near a good market becomes paramount to all other objects; next to it in importance should be the quality and quantity of the land for fruit purposes.

For small fruits, a farm of ten to twenty-five acres, located within three to five miles of a good market, and costing originally $200.00 to $300.00 per acre, will be found at the end of five years, *a more profitable investment* than a similar tract of land located twenty to thirty miles distant from the same market, and costing $25.00 to $50.00 per acre.

This is a proposition I can verify from my own experience.

For twenty years I was located at Glenwood, twenty miles distant from Council Bluffs, and depended largely upon the markets of this city and Omaha.

For twenty years I paid the express companies and commission agents enough to realize the force of my proposition.

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Second in importance to location, is that of planting the farm to fruit. Varieties and quality of plants figure very differently in their first cost, but poor varieties and poor plants may prove a source of *poverty* rather than *profit* to the planter. There is no field in which we may better realize the force of the axiom, the best is the cheapest, than in that of fruit growing. It costs just as much to set out and care for a plant of a poor or worthless variety, or one of poor quality, as it does to care for one of the best variety and quality of plant, and it takes from two to ten years to realize the full extent of your loss if you have made improper selection in the variety and quality of plants.

The distance apart for planting both trees and plants should receive careful consideration.

It is poor economy to *crowd* trees or plants. The same principles that a wise farmer would use in pasturing and feeding stock should be applied by the fruit farmer to his trees and plants.

Another field in which we may prove to be "penny wise and pound foolish," is in the after care and cultivation of our fruit plantation.

A neighbor, in remarking to me the past season, upon my clean and well-tilled strawberry field, said that he could not afford to keep his patch clean, "hired help was too expensive."

Another neighbor, just entering the horticultural field, has his place well planted to fruit, but feeling loth to give up his former pursuit of carpentering, continues to work with his tools and leaves the care of the twenty-acre farm to his wife and a "hired boy." In spite of their best efforts the place grows up to weeds.

Those who are experienced in the care of a fruit farm can answer the question, "Does it pay to give way to the weeds for the sake of saving from the hired help bill?"

There are other lines in which true economy may be practiced, but let us remember, in seeking to apply it, this wise principle: "There is that that scattereth and yet increaseth, and there is that withholdeth more than is meet but tendeth to poverty."

FROM THE QUESTION BOX.

1.—What is the best evergreen for windbreaks in northern Iowa?

DR. BAILEY AND MR. HOOPES: White Pine.

MR. WATROUS: White Spruce.

MR. PORTERFIELD: Norway Spruce.

MR. BRUNER: Scotch Pine.

2.—What size of evergreen should be set out for windbreaks?

MR. HOYT: If with good roots, the larger the better.

MR. BRANSON: From eighteen inches to two and one-half feet.

PROF. BUDD: Nursery grown twice transplanted trees, eighteen inches in height.

3.—Which has proven most successful with the average farmer, whole or piece root-grafted apple trees?

MR. WATROUS: I prefer a long scion and short root planted deep so as to have new roots sent out above the union.

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MR. BRANSON: I have often had more roots from my grafts above the union than below, by taking long scions and short roots. I prefer the second cut of the root to the first.

MR. BRUNER: Any root below the crown. The crown usually sends out many sprouts. I agree with the others, a long scion and short root, but below the crown.

WEDNESDAY AFTERNOON.

The society visited the grounds and buildings of the Agricultural College and were much pleased and instructed by the appearance of the large numbers of many different varieties of fruit trees—the methods of culture, of winter protection, and also the cellars for grafting and for winter preservation of tender plants. They visited the library, museum and creamery, sampled the cheese and profited by a short lecture on the latest improvements in cheese and butter making. Two hours was too short a time to make all the members graduates in all of the different branches and industries taught at this, our State Agricultural College, but it was sufficient to convince them that the professors are doing thorough work, and that this is one of the best institutions of the kind in the country and is well worthy of the entire confidence and encouragement of every citizen of this State.

PEACHES.

BY JONAS MILLER, WAPELLO.

The question of growing peaches in Iowa has been discussed for and against by the farmers in this State, and experiments have been made which resulted in failure in a great measure. Still we have men who claim they can raise more crops of peaches than apples.

In order to grow peaches successfully in Iowa the tree requires protection through the winter, and how to apply this protection has been the question.

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To tie the tree up with corn fodder has been a failure; to lay them down and cover with earth, the same as we treat our vines and blackberry bushes, has also been a failure.

In the former the buds winterkill and in the latter the buds will rot.

My plan has been to grow the most hardy varieties and to train the tree so that it can be bent down in the fall. Take a one year old tree and divide the roots, and plant so that the roots will be to the east and to the west. In the fall take the spade and remove the ground on the south side; as there are no roots on the south side and north side, the tree can be laid down toward the south; put a stick of cord wood or post on the top and fill in about the roots, then your work is done; one inch of snow is all the protection the tree needs.

If there is danger of a late growth dig the ground away on the last of August or the first of September and it will hasten the wood to mature. It gives you a good opportunity to look for the borer; the top will catch the snow and hold it, and it is seldom that we have zero weather that will kill the peach bud when there is no snow on the ground. In the spring, when the ground is thawed out, take off the weight from the trees and raise them up to an angle of forty-five degrees. The south wind will hold them up and they will be a great deal straighter in the fall than they were in the spring when you left them. Trim the top fan-shaped so that it will lay down flat in the fall.

Cultivate the same as you would other fruit trees.

Fertilize with ashes, and when it is necessary use well rotted manure.

Do your pruning in the spring. Cut out all dead wood, and cut back last year's growth about one-half. This will keep the top of the tree in good shape; the fruit will be larger and of better quality. A new disease has made its appearance in the last ten years that is doing some damage. It is first noticed in the spring when the leaf buds start. Instead of the bud making a good growth it forms a little bunch like a rose. The tree lingers for a while and then dies. Whenever this disease is noticed the tree should be taken up and burned.

PEACH GROWING.

BY DR. J. I. BAILEY, WEST BRANCH.

It is only fair to myself to preface this paper by stating that I am a tyro as to the nice theories of peach culture, so I can only give you such facts as have come under my immediate notice, and that of some of my friends whose many practical lessons are more rich in plain, commonplace fruitage than prolific of the sweet, intoxicating odor of scientific theory.

Seedling peaches can be grown successfully in eastern Iowa for the

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reason that they *have* been successfully grown for many years, as witness the following array of evidence:

F. F. Fisher, a hardware dealer of West Branch, says his father raised seedling peaches successfully on his farm near Solon, Johnson county, for over thirty years, and that they have found them more prolific in fruitage than apples.

Laurie Latum, an early settler of Springdale, Cedar county, says he raised seedling peaches successfully for many years, but did not succeed with budded fruit.

M. J. Graham, of Adel, Dallas county, in a letter to the writer, dated October 30, 1893, says: Two parties in this county had peaches by the wagon load this year from seedling trees which they have been breeding up for some years. The China and Bokara on my place (high timber land), did not produce a single specimen.

A. Branson, of New Sharon, late of West Branch, in a letter to the writer, dated November 22, 1893, says: I have been corresponding with parties at Muscatine in regard to peaches; have learned that Isaiah Stanley, from whom my seed came, got his seed from W. M. Stoutsman, seven miles north of Muscatine, and that Stoutsman got his seed from Frances A. Hunt, of Scott county, twenty-three years ago, and that these trees bear at three years old from the seed. These trees, in the neighborhood of Bloomington, north of Muscatine, have been called the "Home" peach for a number of years. They are all free stones, all of good quality, and are very hardy. I find you got your trees of me in the spring of 1885. They were then three years, from the seed

I wish to add to this array of evidence that the writer, in the last five years, has grown five successive prolific crops of peaches from seedling trees.

That some seedling peaches are capable of reproducing their own variety is incontrovertible. This is witnessed by the above statement of Mr. Branson, and by all those who have grown this particular variety for many years, and also by the experience of the writer. All the bearing peach trees in my orchard are seedlings, and all are alike in habit and foliage.

Experience has taught me that some seedlings are very hardy, being slow of growth, of low or dwarf habit, and being late to bloom are not injured by frost. As the parent trees in the writer's orchard are now eleven years old from the seed and are still in a vigorous condition despite the terrible winters of the last decade, the evidence is certainly incontrovertible that the seedling is hardy, and is thoroughly acclimated to this dangerous latitude for the peach.

From observations taken by W. S. Fultz, a fruit grower of Muscatine county, I submit the following statistics of the extremes of temperature during the years that the writer's trees were young and tender: 1883, Jan. 9, 24° below zero; Jan. 22, 24° below; Feb. 5, 20° below; 1884, Jan. 4, 23° below; Jan. 5, 30° below; Jan. 6, 24° below; 1885, Jan. 19, 22° below; Jan. 28, 30° below; Feb. 10, 30° below; Feb. 11, 20° below; Feb. 13, 30° below. As Mr. Fultz says in his letter to the writer, 1884 and 1885 were known among the fruit growers as the test winters. Since then we have had nothing to compare with them in the degree of cold. I think the point is made clear that this variety of seedling is hardy, and is acclimated to this temperature.

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The fruit is above the medium size, has small pits, is a free stone, the flesh is firm and rather light in color, while the flavor is rich and slightly tart. They should be planted on the north hill side without shelter of any kind. I would cut them back closely the second year, causing them to assume a dwarf habit. Would cultivate the ground while the trees are growing, so they may become well rooted.

Finally, permit me to say that there is a great advantage in raising a reliable seedling for the reason that, as the peach is at best a short-lived tree, much time and money can be saved by planting the seed instead of planting the budded varieties (which the most of us would have to go to the nursery for), thus securing a succession of crop with very little expense.

But do not let us forget it is with peaches as with any thing else; nature will be lavish with her gifts in this respect if we will only put ourselves in proper position to receive them — for man has as yet never had a want but that was finally filled from nature's bountiful store-house.

We all know that prejudice has always been the enemy of progress, and has retarded the happy consummation of many blessings. Even this splendid seedling peach was for many years an outcast and nameless, and its many excellencies unknown only to a few persons who appreciated it, until this society kindly gave it a name and thereby a place among nature's manifold blessings.

DISCUSSION.

MR. LATHROP: The "Bailey peach" originated a short distance above Muscatine, and has been propagated in that vicinity for twenty-three years by Mr. Jacob Frantz, Mr. Statzman and Mr. Isaiah Staley. Some ten years ago Mr. Staley raised forty bushels of the fruit. It was at this time that Mr. Abner Branson got a peck of the seed and planted it in his nursery at West Branch. From this planting Dr. Bailey got six trees, five of which lived and since they were old enough have borne good crops of fruit each year, yielding at times five bushels to the tree. This peach was first brought to public notice by Dr. Bailey at the meeting of the Southeastern Iowa Horticultural Society held at West Branch in December, 1892, and was named by this society the "Bailey peach." I went down last fall and examined the peach trees in the vicinity of West Branch. The Bailey trees branch out near the ground. The others are taller and branch out from a center stem. Now, inasmuch as trees growing like a currant bush have given good results for several years past, I think this is the way we ought in the future to train them. Cut off the tops near the ground, and compel them to send out low branches. These trees are growing without protection and on quite low grounds.

C. W. DAVIS: Has any one ever raised these Bailey reaches as far north as Ames?

SEVERAL MEMBERS: Not yet. West Branch is only about twenty-five miles south of Ames, and they grow and produce abundantly there.

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MR. DAVIS: Is not the ground near a slough the best for fruits? As I understand it, trees like the solid clay soil which is usually found near the water.

MR. BRANSON: My trees are near the top of the hill.

MR. BURTON: If the summer's growth is well ripened before winter, they will stand unharmed a very severe temperature. But if the wood has not fully ripened, even moderate cold weather will cut them back or destroy the tree. So I think the question is, How does a tree go into winter quarters? If the twigs are well matured it is very likely to pass through our coldest winters unhurt. There is another point worth considering. If the buds are slow to open, then a few hot days in January, February, or early March will not expand them enough to render them easily killed by sudden cold snaps which may follow.

MR. LATHROP: But in the same year, the fact that some varieties withstood severe temperatures, while other varieties, like the Bokara, failed, is a comparative test.

WHAT MAKES MUSCATINE A NOTED GARDEN SPOT?

BY W. H. HOOPES, MUSCATINE.

In introducing my subject it may be of interest to my hearers to know something about our city. Muscatine is a thrifty manufacturing and commercial town, containing about fifteen thousand population. Beautiful in situation, mounted on the high bluffs overlooking the Father of Waters, and gradually receding into the lowlands surrounding their base with the old Mississippi gliding gently along her eastern front. On the eastern border line of our beloved State, in the great bend of the river, Muscatine commands one of the most beautiful landscape views of any city in the State. In O. M. Babcock's book entitled, "Cosmonics of the United States," in his calculation regarding our future says: "Our moving center of population, which has been moving rapidly to the westward, will come to its final stand in the future on or near the Mississippi river not very far from Rock Island," hence close to Muscatine, and that it will be headquarters for settling great social questions. He says the conflict of ages will end in the great Mississippi valley, hence in the future (the valley of decision) and for business purposes we are now very centrally located and well connected by railroads with the leading cities of the great west, being almost equi-distant from St. Louis, Kansas City, St. Joseph, Omaha and Council

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Bluffs, Sioux Falls, Minneapolis and St. Paul, Milwaukee and Chicago, with a host of thriving intermediate towns.

We are also well connected by the Mississippi river with all the towns lining her banks from St. Paul to the Gulf, and at no distant day we shall be connected with Chicago and the cities bordering the Great Lakes by way of the Hennepin canal, of which Muscatine will be the natural western terminus Thus you see our business relations with the surrounding country are unsurpassed.

Nature has endowed our county with a great diversity of soils, many of them of peculiar adaptability for the culture of vegetables, as has been clearly demonstrated during the past few years. Among the first canning factories in Iowa was one established here, and we have with us the Muscatine Royal Canning Company, that annually turns out large amounts of goods, such as canned corn, tomatoes, peas, beans, squash, etc., of the finest quality, and to-day this establishment holds an enviable position among the canneries of the United States. In 1891, when the bounty of *two* cents per pound was offered by the government on sugar produced from beets grown in the United States, and under the wise provisions for experimenting made by our lamented Hon. Jerry Rusk, we were induced to investigate the nature of our soils, and for this purpose seed was provided and given out to our farmers and planted under directions furnished by the government. This resulted in our receiving 210 samples grown in various parts of the county, and on different kinds of soil. These samples were sent to the experiment station in Ames, and the analysis made under the direction of Prof. G. E. Patrick, and with very flattering results, the percentage of sugar in the beet being the highest of any samples in Iowa. The 210 samples containing a mean percentage of 12.82 sugar in the beet. We also sent to Prof. Harvey W. Wiley, chemist of the Department of Agriculture, at Washington, thirty-one samples, showing an average of 14.10 per cent of sugar in the beet. Prof. G. E. Patrick, in his report to Prof. Wiley, says this is a magnificent showing, and indicates that the soil of Muscatine county is especially suited to the growth of the sugar beet. And again he says, "certainly no further evidence than this will be needed to convince anyone that the county of Muscatine, in Iowa, judging at least by one season's work, is extremely well adapted to the production of sugar beets of high quality." These facts being known in connection with a subject of which I shall speak later, attracted the attention of one of the largest pickling and preserving works in the United States. This firm, seeing the rapid growth of the great northwest, and a growing demand in this direction for their condiments that are found on the shelves of almost every first class grocer in the United States, sought a western location, and to-day we have established in our city the western branch of the largest pickling and preserving works in our domain. The H. J. Heinz Company, of Pittsburg, Pennsylvania, annually put out the products of thousands of acres of vegetables and employ one hundred and fifteen salesmen on the road and six hundred hands in their mammoth bottling and preserving works at Pittsburg, besides a large number of hands at their different salting stations in various parts of the country. This firm has cast its lot with us, and at no distant day expect to make the establishment here the equal of the Pittsburg plant. The excellency of their goods needs no further proof of superiority than to know that they carried off eighteen of

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the prizes at our great Columbian Exposition. In addition to the already named favorable indications that Muscatine is well suited to the growing of vegetables, we have here the famous Muscatine Island, *the garden-spot of the great northwest.* In order that my hearers may form some idea of this noted spot of land, I will try to briefly describe its appearance and location.

The northern end of the island is located in the southwestern portion of our city, on which a large portion of our lumbering mills and factories are located. Taking a southerly course for about twenty miles, its eastern shore is washed by the Mississippi river. You can now imagine a piece of land something in shape like a half moon with the curve toward the west, having an average width of about three miles. Cut off from the main land by a stream of water known as Muscatine Slough, leaving the river at the northeastern end of the island and taking its course along the foothills that fringe its western border, meandering along in a kind of semi-circle until it again enters the river, thus cutting off the island from the main land and forming the receptacle for a host of sparkling little brooks that come rippling down through the wooded bluffs that separate the island from the prairie lands beyond. The island is a low, flat piece of land, many portions of it being below high water mark, and with the exception of a margin bordering the slough line, and an occasional depression dotted here and there filled with loam and decayed vegetation, the island is one vast bed of *sand.* This piece of land in early times to the extent of one-half to two-thirds of its surface was subject to annual overflow. But finally it was decreed that this island should in a large degree be redeemed, and to this end a levee was constructed along the river bank and the slough where leaving the river filled up, thus causing the water that formerly entered the slough at the northern end to find an entrance at the outlet some twenty miles south. Thus by the fall in the river for that distance causing a difference on the inside of the levee and the river during high water of about six feet, and redeeming thousands of acres of land. The sandy soil of the island, which constitutes a large portion of it, is too poor to raise field crops with profit, hence the owners were forced to seek other lines of husbandry, and with what success remains to be told.

With a knowledge of the nature of certain vegetables and constant experimenting, it was soon found that this island was peculiarly adapted to the growing of melons, sweet potatoes, and other vegetables, and for a number of years this line of horticulture was carried on in a limited way. But within the last few years it has been taken hold of with increasing vigor, until to-day the growing of melons, sweet potatoes, asparagus, radishes, onions, peas, beans, tomatoes, etc., form by far the largest and most profitable part of our products. Our watermelons are remarkably free from coarse fiber, and of rich, sweet flavor. Our nutmeg melons are of delicious sweetness, and the sweet potatoes the equal in quality of any grown in the United States. In addition to these staple articles we have had great success in the line of early vegetables such as asparagus, onions, radishes, peas, beans, cabbage, tomatoes, etc. Owing to the fact that our porous, sandy soil is susceptible to the sun's warm rays, our soil heats up much quicker than ordinary soils. Hence we are able to plant earlier, and being so close to the water level, have an abundance of moisture. These natural advantages, aided by a bountiful supply of fertilizers, in addition to good culture, enables us to produce our crops from six to ten days sooner than crops raised on

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ordinary loam or clay soils. Thus, with the advantage of a soil so peculiarly adapted to the growth of these lines of vegetables, and the advantage of earliness, with a market to the north and west of us practically unlimited and always glad to get our goods, is it any wonder that this field of industry has called forth the best energy of a large number of active business men? And as a result, my hearers, thousands of acres of this island that were once considered almost worthless, have been made to blossom as the rose, and are now teeming with activity, and thousands of barrels of sweet potatoes, and hundreds of cars of watermelons, and mixed cars of vegetables are annually shipped from here, reaching markets as far west as Denver and north as Winnepeg, and hundreds of intermediate points. And the express cars almost daily leave our city from early spring till summer loaded with boxes and baskets of our early vegetables, that reach almost every city or town for hundreds of miles to the north and west. Thus you see our resources are great and our markets practically unlimited, and there is no telling to what extent this business, now so well begun, may be developed in the near future. And I wish to remind my hearers that there may be other tracts of land in Iowa that are considered almost worthless that can be redeemed and prove as great a blessing to their owners as our island has to us.

I have thus briefly tried to show you that our location, adaptability of soil, earliness of production, quality of our vegetables, means of transportation, backed by energy and business tact, has made Muscatine the noted garden spot of the great northwest, and to-day vegetable growing is second among the leading industries of our city. And what has been accomplished here may be accomplished in other parts of Iowa thus highly favored.

DISCUSSION.

MR. HOOPES: Our best land is composed of sand about six feet deep, while black sand only two or three feet deep, underlaid with coarse gravel, is nearly worthless. Beets grown on a sandy loam are the best for sugar. Our best land upon Muscatine island is sold for about $300 per acre. In my opinion, watermelons raised on the prairie soil are more apt to be spongy and tasteless, like the pumpkin, than those raised on our island.

PROF. PAMMEL: It is sometimes said by prominent men that watermelons and pumpkins will mix if planted near each other. But this is a mistake. They do not mix.

DISEASES OF THE CHERRY.

BY PROF. L. H. PAMMEL, AMES.

At your last meeting I presented a paper on "the diseases of the grape." In order that my work may be of greater service to working horticulturists,

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I shall, at different times in the future, perhaps, discuss other diseases. Cherry culture in different parts of this State has become quite an important industry, and the more we learn about the diseases the better shall we be qualified to grow them successfully.

SPOT DISEASE OF THE CHERRY (*Cylindrosporium padi*, Karst).

This disease has been quite troublesome in many parts of the United States, especially in the nursery.

The common names of this disease are numerous. I frequently hear the name "rust" a term which should only be applied to rusts proper like the rust of wheat, the cedar apple fungus, and other diseases of this character. It is unfortunate that this term should become fastened to diseases like spot disease of the cherry. What we need in vegetable pathology is some uniform system of naming diseases of plants.

History.—The fungus was described by Karsten who found it on the May Tree (*Prunus padus*), in Finland. It was studied quite carefully by Dr. J. C. Arthur, while he was connected with the New York State Agricultural Experiment Station at Geneva. Mr. T. T. Lyon of Michigan, has also reported on the prevalence of this disease in Michigan. Prof. Taft of the same State has made a report on the disease as occurring in Michigan.[1] We also have several papers by Prof. B. T. Galloway and Mr. D. G. Fairchild, both of the division of pathology of the United States Department of Agriculture, Washington, D. C., devoted mainly to the treatment of this disease.[2]

In several bulletins of the Iowa Agricultural Experiment Station will be found full accounts of the history of this disease,[3] as well as treatment.

DISTRIBUTION AND PLANTS AFFECTED.—This disease is common east of the Rocky Mountains, from Massachusetts to Iowa. It is common in our Wild Black Cherry (*Prunus serotina*), Choke Cherry (*Prunus virginiana*), Wild Plums (*Prunus americana*), European Plum (*Prunus domestica*), Cherry (*Prunus cerasus*), Sweet Cherry (*Prunus avium*), Mahaleb (*Prunus mahaleb*); occasionally on the Apricot (*Prunus armeniaca*), and Peach (*Prunus persica*).

I have made some observations on this disease for several seasons. It is by no means a new disease for Iowa, as Prof. Budd informs me. He has long been acquainted with it, especially on the Early Richmond; the fungus has been so destructive on this variety that its cultivation on the College Farm had to be discontinued. Many of his correspondents report similar failures. Throughout the State, Dyehouse, English Morello and Montmorency suffer, especially on black, rich drift soil, but not so extensively on the bluff or ridge soil of lighter color. The disease is most severe in the nursery, affecting every variety on the college grounds, though some are more affected than others. Such varieties as Gros Gobet and the Orels suffer quite as much in the nursery as the Richmond and Montmorency, but when the Orels are once well established in orchards they can apparently resist the disease, but the Early Richmond and Montmorency do not do so to the same extent. More resistant to the attacks in well established trees are such varieties as Double Natte, Duchess d'Angouleme and Brusseler Braune. Seasons also more or less influence the severity of the disease. In

[1] Bulletin Michigan Agricultural Experiment Station.
[2] Journal of Mycology.
[3] Bulletins Nos. 13, 17 and 20, Iowa Agricultural Experiment Station. Bulletin 13, Iowa Agricultural Experiment Station, p. 56.

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1889 the disease was unusually severe on many of the varieties, but in 1890 some of the trees which had lost much of their foliage in August the year before, were scarcely affected, and consequently the damage was but slight.

The disease is also more severe in new orchards, especially before the trees are well rooted. In a new cherry orchard consisting of Russian varieties, the trees being well rooted, have, during the past two seasons, not shown much of the disease, but the younger trees of the same variety and close to the older trees have suffered considerably. In 1888 Director Speer set out a trial orchard of many varieties. They were budded for the most part on Mahaleb, some on their own roots, while the remainder were root-grafted on the Mazzard. The following year (1889), nearly every tree in the orchard was more or less affected with the disease. Some of the trees lost many of their leaves as early as July, and in August many of them were bare.

In another orchard, but on higher and better drained soil, well established trees of Brusselar Braune, were almost free from the disease, but young cherry trees of the same variety along side of it were badly affected. I believe there can be little doubt from these observations, that when trees are once well established and rooted the disease is materially checked.

Further observations for several seasons have convinced me that no uniform rules as to resistant varieties can be established. Early Richmond trees set out many years ago by Dr. Welch have not, during the last two seasons, shown the disease, with the exception of 1893. These trees have borne heavy crops. In an orchard containing well rooted trees of Brusselar Braune and Double Natte many have suffered seriously. On my own grounds which are in part Late Richmond and several as Prof. Budd informs me, are Russian cherries, there has been little trouble from this disease. I cannot theorize as to the absence of the disease from my grounds.

CHARACTER OF THE DISEASE.

About the middle of May, especially in the nursery, reddish or somewhat paler spots make their appearance on the upper surface of the leaf. On older trees this appearance is usually not noticeable till the middle of June and later. At first these spots are small, less than one-sixteenth of an inch across, usually round and somewhat restricted in area, they gradually increase in size until, in many cases, they are one-eighth of an inch across. In severe cases a large number of small spots appear in a cluster which finally become confluent, forming one large spot. When near the veins the spots are more or less angular. In a short time the spots become brown and the whole leaf assumes a yellow color and falls. On the peach which it affects, Prof. Arthur says: "The fungus rarely produces many *Septoria* spores, but after growing awhile, the tissues of the leaf containing the parasite become dry, separate perfectly from the surrounding healthy tissue, and drop out, leaving a round hole as cleanly cut as if made artificially." In cherries these holes are not common, though they may frequently be found in plum leaves.

An examination of the lower surface of the leaves, directly opposite the spot, will show a small elevated body, yellowish in color and somewhat glistening, especially in fresh specimens. In many cases, however, these affairs are broken and surrounded by white pellicles, usually having spread for some distance.

MICROSCOPIC CHARACTERS.

A cross-section of a leaf through one of the pustules before it has broken open will show the following structure: An upper layer of epidermal cells bulging out, due to the upward growth of the fungus; below this layer of cells is a mass of

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elongated spores. These spores are in some cases plainly several-celled, though often one-celled. At the lower end of this collection of spores is a dense collection of shorter hyphæ, known as the stroma. Coming from this and extending between the cells of the cherry leaf is the mycelium. The mycelium takes up the nourishment from the cells. These, as well as the "palisade cells," are brown and dead. The compact stroma from which the spores arise and the mycelium extend into the leaf, while the spores have grown outwardly. The spores are at first small, they increase in size until they are much longer than broad and slightly curved. When growing in such large numbers it requires but little to rupture the delicate epidermis of the leaf, thus allowing the spores to pass out in tendrils. I made sections of leaves of *Septoria pruni*, sent me from Kansas, and even after soaking they were unsatisfactory. The pustules were, however, deeper seated.

In addition to this stage, which may be called the summer form, two others have been found. One is undoubtedly a *Phoma*, which makes its appearance on the fallen leaves in the form of black bodies, known as perithecia. The spores of this fungus are colorless, and form on the ends of vertical threads. That this fungus is connected with the *Cylindrosporium* may be safely assumed, since the spores of the latter frequently occur with it. Then, too, it occupies the place of the pustule of the *Cylindrosporium*.

Later, about May, the same perithecia which contain *Phoma* spores, produced elongated sacs or asci, which contain elongated spores, ascospores. Prof. Arthur, who kindly favored me with material of the *Phoma* and perfect form of the fungus figured in this report, is undoubtedly correct in assuming a genetic connection. It has been a very difficult matter to clearly make out the entire structure of the perfect fungus. It is hard to determine the number of asci in one of the sacs, or the presence of sterile threads, paraphyses. See Fig. A.

CHERRY AND PLUM SCAB (*Cladosporium corpoplilum*. Von Thumen).

It is proper that I should call attention to the disease in this connection, as it is apparently on the increase in Iowa.

The fungus occurs on several hosts, and has been known to occur on the peach prior to its having been found on the plum and cherry. Its destructiveness to the cherry was first noticed in 1891 on the college grounds. I had previously observed the fungus on the plum, and in 1889 I wrote as follows: "For two seasons I have watched with some interest a fungus which causes the plums of some of the cultivated varieties of *Prunus americana*, especially the Miner, to become spotted and more or less scabby. So far as I know this has not been recorded before, though Prof. Osborn informs me he had observed a similar appearance for some years previous. It is not improbable that the disease may be quite common in the Northwest. The cause of this spotting is a parasitic fungus which seems to be closely related to the fungus causing the black spot disease of peaches (*Cladosporium carpophilum*). This species was described by Felix Von Thumen in 1887, and he records it as very troublesome in that year and the year before. Recently Prof. Arthur has recorded it as very widespread in Indiana, and Dr. Erwin F. Smith records it as quite destructive in Delaware, Michigan, etc. This disease was common on the cherries at Ames in 1892[3].

So widespread is this fungus to the native plum in various parts of the United States and Canada that I have been requested to give short accounts by several investigators[4]. That portion bearing on the cherry is here repeated. The *Cladosporium* has become in this section a serious enemy also to cherries first noticed in 1891,

[3]Agricultural Science, Vol. VII., p. 27.
[4]L. H. Bailey, Bulletin No. 38, Cornell University Agricultural Experiment Station. John Craig, Experimental Farms, Dominion of Canada, Report for 1892, pp. 101-103.

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when it destroyed two to ten per cent of the crop. Its first appearance on cherries is marked by a pale colored spot not larger than a pin head, which increases in size, and finally is olive green in color. As in plums a crack is frequently found extending across the patch. The cherries become also badly shrivelled in many cases, besides being somewhat sour and bitter. We noticed the following varieties affected in 1891: Cerise d'Ostheim, Spate Morello, Shadow Morello, and Wagner; and in 1892, although the cherry crop was small, the disease appeared on many cherries. My assistant, Mr. Stewart, has furnished me with the following lists: Lutovka, Shadow Morello, Schatten Morello, and Spate Morello. It will be noticed that this list only contains Russian varieties, as most of the cherries grown on the college grounds are from Russia. Early Richmond, however, growing not far from the college was not affected by the disease; it may have appeared in other places, but I have not heard of any, or at least specimens were not sent to me. It did not appear to any extent so far as I know on cherries this year, because the crop was an entire failure.

Characters of the Fungus.—"Microscopic examination of the affected portions of the plum shows a nearly colorless mycelium creeping over the surface of the fruit, or vegetating between the cuticle and the remainder of the epidermal cells. In the darker portions occur the septate hyphæ. These occasionally come through the cracks in the cuticle. In older material a dense stroma of short brown hyphæ, appears between the cuticle and cellulose layers of the epidermal cells. The small spores are oval in shape, pointed at the end, usually two-celled, and are borne at the end of the conidiohpore, or laterally. They germinate readily when placed in water."

CHERRY POWDERY MILDEW *(Podosphaera oxacanthae).*

Powdery mildew of the cherry is a common and destructive disease of the cherry in many parts of the United States and to be brief here I may state that it is well characterized by the powdery appearance of the leaves during the summer which begins in July and continues till frost. This powdery substance is made up of a mycelium which creeps over the surface of the leaves, and sends small haustoria or suckers into the epidermal cells which abstract nourishment. This mycelcium sends up erect hyphæ which bear spores in chains. These spores germinate immediately and propogate the fungus during the summer. Later in the season there occur yellowish and brown bodies known as perithecia. The yellow are immature but the brown bodies contain a large sac (ascus) which contains several small elliptical bodies known as ascospores. These ascospores carry the fungus over the winter, they germinate in spring and thus spread the disease the following season. The brown perithecia have coming out over them several stiff threads branched at the end known as appendages.

BLACK KNOT *(Plowrightia morbosa).*

This fungus so far in Iowa has only been found on plums and once on apricots. In the east however, it is very troublesome to the cherry. A brief account will therefore be very appropriate. It is well known by the black excrescences which may be seen at this time of the year on many of our wild plums and the cultivated European plum *(Prunus domestica).* During the summer these warts are olive green in color, it starts a slight swelling in the branch and continues to work its way down and up the branch and unless cut off the whole branch will be involved. The black warts during the month of March and April have sacs *(asci)* which contain eight ascospores. These sacs are surrounded by sterile threads

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known as paraphyses. As to the method of treatment of these various diseases we suggest the following:

For leaf spot disease use Bordeaux mixture and apply as early as the middle of June and continue to apply every two weeks up to the middle of August. In seasons of much precipitation, it will be necessary to apply more frequently as the mixture is likely to be washed off. As yet, I cannot say that there are any resistant varieties. For fuller details of making those preparations you should obtain bulletin No. 20 of the Iowa Experiment Station which will give full details of information as to fungicides and time of application. For powdery mildew the same treatment may be recommended. Cherry scab, no positive information can be given. Bordeaux mixtures will no doubt prove efficacious if applied early. Make the first application when the plums are as large as small peas.

DISCUSSION.

MR. PORTERFIELD: In some countries trees are carefully watched and their diseases cured or prevented, while in Iowa but little attention is paid to such mishaps.

The Committee on Place of Meeting recommended Wapello for 1894, and Sigourney for 1895. On motion adopted.

Motion made and carried that the thanks of this society be given Mr. Strohm for the accurate and faithful manner in which he has discharged the duties of treasurer of this society for over twenty-three years.

WEDNESDAY EVENING.

PRESIDENT PORTERFIELD'S ADDRESS.

Another year has gone since our good meeting at West Branch, and how has it been spent? We all remember how we wanted a change. We talked for it, worked for it, when the time came voted for it, and we got it—got it hard. The facts are, since the change we have had very little change, about the only change we have done since is to change an I. O. U. at three per cent with some kind banker for a little ready cash. We cannot tell how long the change will last; it reminds us of the man who was troubled with a bear, and set out to catch it; after he had been gone for some time his wife called: "John, did you get the bear?" The answer came back, mingled with terror: "Yes, got him, but the question is, how to let him go." This world is full of changes, and we suspect when we get to the next some of us will want a change worse than we ever did before. But in spite of changes, hard times, and everything else, we have reason to take courage and go forward, there are so many things in this world to make us feel good. The Ohio man still sells his budded trees, the Missouri man his whole root-grafts, the Minnesota man his never-dying Thompson's seedlings, the Nebraska man his

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model orchard, and the other men seedless pears, runnerless strawberries, tree currants, etc., and now we see there is something new under the sun, namely, the white blackberry, and the Iowa farmer believes the dear man and buys the whole business. Oh, this is a world of progress and good things, and the horticulturist believes in keeping things on the move. We have had a year of hard work, ploughing and hoeing, pruning and picking; we are now here for improvement and pleasure, and let us have a good time.

It may be that you expected the President's address to contain a long list of what should be done and what left undone, but Congress pays about as much attention to the President's message as the average office holder does to the promises he makes before election. But we could mention some things that we should do, and one is to extend a vote of thanks to the dear express companies; now, don't look, if they are not *dear*, what is? They take such a kindly interest in our welfare, and handle our fruits so cheaply; why, some of them are willing to make short hauls and not ask us a cent over and above what we get for fruit, after it is hauled, of course. If it goes any distance we expect to pay them a little more than we get out of it. Then they are so good about answering a letter; if you send them a stamp they use it at once to write to some other fellow. We have been looking after them for years, but never as a society got down to business, and this year we should do something.

We don't know as we need to say anything about the the treeman at large as he will say enough for himself. We are glad the ladies have so kindly offered to help us, and we will always take off our hat and say "God bless the ladies." We feel like thanking the society for its kindness to us, and while its chief officer, we have tried to make our meetings pleasant and interesting and hope you have enjoyed yourselves. Last winter the State society in re-districting the State, put our district and that of the secretary into one of the other societies, but our fellowship in the Southeastern has been so pleasant we still hope to meet with you and do what we can to help you. In closing all we can say is have a good time while here and when we separate to go home, let us make up our minds for the next year to do less grumbling, make more money and spend it for the good of others, strive to make our calling an honorable one, feeling that with all the wet weather, dry weather, hot summers and cold winters, poor employes, high wages and little cash to pay them, we still have a good deal to be thankful for; and let us remember when we educate the boy and girl to love nature and its beauties, we are drawing them nearer to God who created all things that are beautiful; and by doing this we are making better men and women of them, and making them happier in this world and the world to come. The true horticulturist is doing a work for time and eternity, and although there are times when discouragements come, let us ever remember that this world is but a preparation the better to fit us for the grand possibilities that are in the future.

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CHRYSANTHEMUMS.

BY WESLEY GREENE, DAVENPORT.

The chrysanthemum or gold-flower, came to us from the Orient. Its cultivation there dates back to the time when the mind of man runneth not to the contrary. Its introduction into Europe is of more recent date, while in this country it is less than one hundred years. Ten years ago the first chrysanthemum show was held, although plants had been seen at exhibitions some thirty-seven years prior to that time. These shows are now held annually in nearly all the large cities and in many of the smaller towns throughout the country. These public exhibitions have given quite an impetus to the cultivation of the Queen of Autumn. The chrysanthemum of to-day shows a wonderful improvement over the arthemesis of our grandmothers' gardens.

Of the different types we have the Chinese, Japanese, Anemonese and Pompon. By the continued crossing of the different varieties the seedlings are losing their distinctive typical characteristics, so that it is oftimes difficult to determine to which type the new seedling really belongs. There are so few plants as easy to cultivate, or sure to bloom, that they have become quite popular. They yield readily to, and abundantly reward, the efforts of the skilled cultivator.

Chrysanthemums may be propagated from seeds, cuttings, young stools or sprouts, division of old roots or clumps and by layering. Seed sown in March in pots or flats filled with good garden soil and placed in sixty degrees of heat will germinate in ten days. As soon as the plants are well up prick off into other pots or flats to prevent damping off, transplanting to larger pots as they grow. Keep them moderately cool and near the glass where they will get plenty of light and air. Never let them suffer for want of water. A plant that gets pot-bound, drawn, or the wood hardened in its early growth never makes a good plant afterward. Better throw it away.

Cuttings root readily in damp sand. They may be made at any time from the first of December to the first of July and make good blooming plants by November. The only advantage in early struck cuttings is to work up a stock of scarce varieties, or grow very tall standards. April or May is usually early enough to start plants.

Propagation by division is simply separating the old plants or clumps usuall from the open ground.

Propagation by layering is seldom resorted to, except in cases of accident, where the plants get broken down or become unshapely from neglect, or get too tall and it is desired to put new roots on the old tops. This may be done in August or early in September. They root readily and make nice dwarf plants for the window. The stems are usually quite brittle at this time of the year, so, to

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prevent breaking off, cut on the upper side of the stem and toward the top. Make the incision about one inch long and to the center of the stem. Then, by taking hold of the stem above and below the cut, give it a gentle twist so as to bring the top part of the cut stem over and down by the side, making a V shaped bend; bring the top into an an upright position; peg down, stake and tie the top securely to it, placing the soil firmly about the layer. In about three weeks it ought to be rooted so that the stem can be separated. By the 20th of May it can be planted outside, as that is about as soon as we are safe from hard frosts. While the chrysanthemum is quite hardy, frost never improves it any. Plant three feet apart each way. They should have rich soil, an open, sunny place, yet protected from strong, sweeping winds. Keep them well cultivated. If bushy, compact plants are desired, pinch off the top when six to eight inches high, and then the side shoots should be stopped once or twice. But if desired to grow single stems with large flowers, rub off all side shoots and keep down the sprouts from the roots. Put a neat stake by each plant and keep it tied up.

Whether it is best to grow them in pots all summer or in the open ground, will depend upon how much time can be spared to attend to them. The best results, perhaps, can be had from pot-grown plants, if they receive proper care and attention. July and August are busy months for us, and pot plants are liable to suffer from want of water during the dry, hot weather, and if this extra labor for three or four months can be saved, it is quite an item in favor of open ground culture. Florists are now growing them under glass all summer, planting them about the middle of June on raised benches, in four to six inches of soil, the same as for forcing roses.

Lift and pot the plants before hard frosts come. Pots from six to ten inches ought to be large enough for ordinary sized plants. See that the pots are well drained, then plant firmly, leaving plenty of room at the top for watering. Give them a good soaking and set in the shade for several days. Sprinkle the foliage two or three times daily to keep from wilting. Do not leave them too long in the shade, or crowd them too closely, or they will lose their leaves. When well established give some fertilizer in water two or three times a week. This may be made from manure or commercial fertilizers, viz: nitrate of soda, sulphate of ammonia or muriate of potash.

When the buds begin to develop, disbudding should begin. If sprays are wanted, leave from three to five buds to a branch. If large flowers, only one bud should be left.

In color we have about all the combinations, except those resulting from blue, so that nearly all tastes may be gratified. White and yellow are the best colors in the chrysanthemum.

The list of varieties is very large and still rapidly increasing, so that the novice is apt to get confused in making selections from the catalogues. I will name only a few varieties, as each grower has his own favorite, and would be likely to make a different selection, where there are so many good ones.

White.—Among the white, Ivory stands at the head, if it is not the best chrysanthemum in cultivation. Jessica, Mrs. George Bullock, Miss Minnie Wanamaker, Puritan. The Queen and Nivens, of late introduction, are very promising.

Yellow.—W. H. Lincoln, Harry E. Widener, Mrs. J. G. Willden, Golden Wedding, Citron.

Bronze.—Harry May, Col. W. B. Smith.

Crimson.—Cullingfordii, G. W. Childs.

Pink and Rose.—Mermaid, Mr. Bayer, Viviand-Morel, Mrs. Fotler, Eda Prass, Violet Rose, David Rose.

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Among the Pompons are:
White.—Melle, Martha, Snowdrop.
Crimson.—Bob, Fanny.
Yellow.—Gen. Canrobert, Sour de Jersey.

GRAFTING THE CACTI.

BY GEO. W. CARVER AMES.

Owing to the wide range of possibilities locked in the cacti, much of my time has been devoted to their study for the last few years. Those who have given them little or no study are apt to judge too harshly concerning their merits and demerits. The earnest student has already learned that nature does not expend its forces upon waste material, but that each created thing is an indispensable factor of the great whole, and one in which no other factor will fit exactly as well.

Now the cacti is one of these factors, with doubtless their widest range of usefulness as yet locked up within them waiting for the kindly hand of man, prompted by the necessities of the age, to wave his magic wand over them that they may show forth their long hidden usefulness. We believe the dawn of this era to be now at hand. Florists are speedily recognizing their worth, and many have already given them a prominent place upon their long lists of useful plants. Improvements upon a systematic basis has begun, to which I wish to briefly call attention. All admit that there are few, if any, flowers more beautiful and eagerly sought after than those of the cacti. Even now in their primitive state, the range of form and color in the flowers is so wide and varied as to suit the most fastidious in taste.

The chief reason for this class of plants remaining so long in obscurity, was the uncertainty as to when they would produce flowers. Fortunately this difficulty is being rapidly removed by top-working one variety or species upon another. It not only hastens the flowering season but possesses other advantages as well, which are of no minor importance, viz., the placing of delicate trailing varieties upon strong stocks where they may be seen to better advantage, and are much less liable to suffer from over-water, which is too frequently the case in the hands of the amateur than if grown upon their own roots. If plants which are over-watered do not die outright, they will form a soft unnatural growth which is not favorable to flowering as the wood is immature and the cells not properly stored with starch.

There is no art connected with the grafting of cacti differing materially from that practiced upon our nursery stock. The same precautions must be taken in the selection of varieties in order that the mutual influence of scion and stock may be the best. Varieties in the same genus of course, graft readily, and in fact, many varieties which appear to be widely separated, graft one upon the other with ease. The method is so simple that only a few words are needed for explanation.

The first requisite is that the stock and scion be healthy and in a growing condition, just starting into growth being the most favorable time the work can be performed.

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Top-working should be done altogether, high or low as fancy dictates; root-grafting should never be done as the scion will strike roots of its own if allowed to be in close proximity with ground.

The ordinary cleft-graft is the one most in use, but I am inclined to believe that the whip or tongue-graft may be used with much better results upon some of the slender Cereus, Opuntias, etc., while with some of the thick, fleshy varieties, the saddle-graft is the most desirable. As to methods, every one is at liberty to choose one for himself, endeavoring only to hide the incision if possible, and to get a perfect union. The ball species may be grafted in a variety of ways; if the stock to be used is cylindrical and about the same diameter as the scion, both may be cut straight across and the scion set squarely upon the top and held in place by passing strings up over the top and down underneath the pot. Another favorite way is to sharpen the stock and hollow out the scion something after the style of a flute bud and slip it on. This also should be held in place as above described. The whip and tongue grafting would, of course, need tying. In the cleft or saddle, if the scion and stock are small no tying is necessary, as a good stout thorn run through both will serve to hold them in place. This is the method as practiced by most grafters, but I have had much better success by tying as, I think, in this way liability of failure from a faulty union is greatly lessened. No waxing is necessary in any of these operations, as they unite very quickly. Water should be given sparingly for a few days, being careful that none falls upon the wound.

The object of grafting at first was thought to possess no real value more than that of producing odd forms, and the protection of delicate stock as heretofore mentioned. But experience shows that it greatly increases the number of flowers, also hastens the flowering season and often imparts more vigor to the plant, this being done in exactly the same way as that of our fruits, by simply arresting the downward flow of food material, thus causing a perfect maturation of the wood, which means a large supply of crystalized starch, the essential conditions for flower and fruit.

I wish to call attention to a few plants that can be seen at any time in the college greenhouse. Prof. Budd states that a number of plants of the genus Echinopsis has been in his possession as greenhouse specimens ever since he has been at the college, and not one of them was ever known to push forth a bud, much less a flower. Late in the summer of 1892, a small plant about the size of a goose egg, an offset from one of the older ones, was grafted upon *Opuntia Bigelowii*. As the resting stage of both stock and scion was near at hand scarcely a perceptible growth was made until the following spring and summer, when it commenced to grow quite early. In September it bore three magnificent flowers of a very large size and formed three more buds which did not perfect themselves owing to neglect on the part of the grower. The scion measures now, December 2, 1893, thirteen inches in circumference, with a number of small offsets growing out from it, and both stock and scion are the very picture of health.

Two other grafts were made the same day, using the same variety for stock. Upon one an Opuntia of the cylindrical type was placed; this also labored under the same unfavorable conditions as the former, viz., the closing of its season of growth. The scion was about two inches long when inserted; the following spring it began to grow several days earlier than those of the same kind upon their own roots; it now measures a clear growth of fifteen inches, not including the length of the original scion. As the new growth is all off-shoots from the scion it branches freely, forming a very beautiful top, and is admired more than any in the collection.

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The other was a trailing sort which is thriving and is also much admired. There are a number of others in the collection that are no less interesting, but time and space will not admit of their mention in this paper.

In conclusion I will say that in looking over the astonishing results brought about by the skillful manipulator and originator of new forms, beginning with things that seemed the least promising, dare we not predict that at no far distant date, many varieties of the cacti will grace our homes, and be a welcome guest in the drawing-room, parlor or in any place where a really beautiful plant is needed to impart that bit of brightness to the surroundings, which nothing but plants can do, or perchance, form toothsome danties for the epicurean, and its beautiful and improved flowers grace our occasions of festivity?

On motion, Mr. Carver was made an honorary member.

The society listened to a recitation by Miss Mary Nichols of State Center. On motion Miss Nichols was made an honorary member. The meeting closed with an instructive talk and exhibition of photographic views of places and scenery in Old Mexico, by Prof. Herbert Osborn, Ames.

THURSDAY MORNING.

The committee on boundaries reported the following, which was unanimously adopted:

WHEREAS, The counties of Story, Marshall, Tama, Benton, Linn, Jones and Jackson, formerly included in the Southeastern district, have been transferred by the State society to the Northeastern society; and since, from long association and similarity of conditions and interest with the fruit-growers in the southeastern part of the State, it is the earnest desire of our members residing in these counties to affiliate with this society, therefore, be it

Resolved, That we request the State society and the Northeastern society to consent that these counties be included in our district.

TRANSPORTATION.

BY WM. H. HOLMES, DAVENPORT.

As a horticulturist I am interested only with the rest and do not entertain special views about corporations; but I am in favor of the whole people when they come in contact with corporations, which seem generally able to

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take care of themselves. It is the place of horticulturists, who know their interest, to maintain them and yet do justice to transporters, who usually want to make just as much on watered stock as on any other, and treat as capital invested what has gone to enrich managers or construction companies which are participants, where some directors are not directly related to them, and who make out of all proportion to their real investment.

We will never learn at any cheaper rate than by experience. We all know that in Iowa everywhere fruits of some kind can be raised, and will have a good market when we can reach every town and village, whereas now a large portion is required to pay for the transportation of the rest. Our remedy against the abuses of corporations is at the polls, but we must not rely on partisan legislature to act for the people unless it be the interest of the party. We must attend to our own business and see that none gain an election who will not protect Iowa fruit growers by the enactment of fair laws, that all may plant and till in hope instead of doubt.

The present rates from Davenport to Maquoketa, forty-five miles, is fifty cents per hundred; to Iowa City, fifty-five miles, sixty cents; Cedar Rapids, eighty miles, eighty cents; to Des Moines, two hundred and five miles, $1.25; to Chicago, one hundred and eighty-one miles, $1.25 per hundred; to Milwaukee, $1.25 per hundred. I think the principle applied already to interstate commerce in freight should be applied to all express companies in the State, whose present charges are out of all proportion to the costs and time. It is a mistake that express companies are liable for careful handling, or that they admit liability for delays which is sometimes disastrous to those shipping small or perishable fruits to a large and distant market. If the train arrives after the time for the morning market, the loss on strawberries is usually from two to four cents on a box. In such case the express companies maintain that they are not accountable, and turn their customers over to the railroad companies with the burden of proof resting upon the customer. I do not mean that everything in a car, express or freight, should bear the same rate, for some kinds, as onions or fertilizers, ought not to be carried for the same, but reasonable rates should be charged for part of a car when not injurious, and not as now prohibitory.

Few shippers require a car except dealers in agricultural implements or cattle or grain or coal. The rate should be determined by commissioners that work for and are accountable to the people at large, taking into careful consideration the capital it would require to build and operate roads of the same average quality and capacity. Rates should be regulated by laws made by the people for the masses, not for the corporations, which know how to take care of their own interests. It will take time and many failures to find men to serve as commissioners who cannot be cajoled, intimidated, or bought directly by corporations, and they should not be eligible to any higher or more remunerative office, but well paid in cash and not open to bribery or corruption. If any want partisan aid to obtain other offices in Iowa through these commissioners, we must simply make it impossible that this office should be a stepping stone to higher ones, and have it understood that there is no promotion for a railroad commissioner, and that when they do not serve the people they must retire from public life, and for this reason because they served corporation rather than the public.

This will require intelligent and non-partisan voting so far as the com-

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missioners are concerned, and we must pay the penalty of ignorance until we learn better.

Now a few companies determine that a whole class in a State shall work for them or shall go unremunerated. In the language of the English poet Massey, to the people of England some twenty years ago: "They are but tyrants, while we kneel."

DISCUSSION:

MR. HOOPES: In Iowa we suffer on account of our freight, having to pay high rates on two or more short lines. It is well known that the charges on short lines are much larger in proportion than those on long ones. Now, as our freight usually passes over two or more railroads, we have to pay two or more high rates. Then, again, they do not usually handle fruits carefully. They throw our crates about and often crush the fruit, so that the customer refuses to receive it, and we have no redress. I am willing to enter into partnership with the railroad companies and give them half of the profits on my watermelons. Once I could get a special deal as to freights, but since the commissioners have attempted to control rates I can get nothing reasonable. I much prefer the old arrangement. There are many inconsistencies in our present railroad customs, but we should know what we want and not be continually trying experiments.

MR. GREEN: The Society of American Florists four or five years ago, tried to get lower rates on our products, and after three years, we were able to convince them that they would be the gainers by acceding to our wishes. On our part we agreed to box heavier and make some other changes.

MR. PORTERFIELD: We nurserymen also tried to urge the railroad companies to charge us only reasonable rates, but we never succeeded, only in part.

MR. MILLS: Are not most agriculturists in the same boat? The railroad companies are trying to strike back on account of our granger laws. If all of the societies in the State should combine we might accomplish something, though perhaps not through the legislature.

DR. BAILEY: I will give my experience in fruit growing. A few years ago I planted out four acres in small fruit. My professional gardener cost me $30.00 per month; an assistant, part of the time, $1.00 per day. The second year I received $400.00 gross returns for my fruit, and last year $800.00, leaving $600.00 clear profit. All of this fruit was sold in West Branch, and I was not compelled to patronize railroads. The citizens there are educated up to the daily use of our small fruits. One firm contracted with the growers for all of the fruit raised around our city, and sold it at a profit. I believe this Southeastern society has done more to educate our people than any-

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thing else, and it will benefit every place in which these meetings are held, if the interested citizens will take hold of the matter and urge all in the vicinity to attend.

INSECTS AFFECTING GRAPES.

BY PROF. HERBERT OSBORN, AMES.

While the grape is one of our most important fruit crops very little has been written concerning the insect enemies of this fruit in Iowa. This is not because of lack of injury but probably because in most cases the injury does not result in such complete destruction of the crop. We have a number of common species that are quite constantly to be found on grape vines affecting the roots, stems, leaves or fruit, and causing a very constant drain upon the crop. Saunders, in his "Insects Injurious to Fruits," treats of 58 different species affecting the vine, but only a few of these are commonly destructive in this State; of those which are destructive we can mention here only those of the greatest importance and for more detailed information refer to the excellent treatise of Mr. Saunders, which should be in the library of every horticulturist.

Beginning with those which appear in the spring we have as one of the most destructive the grape-vine "flee beetle" (*Haltica chalybea*). This appears almost as soon as the buds begin to expand and feeds upon the opening leaves and also devours the blossoms or expanding blossom buds and in this way may cause very serious loss in the crop. It is a small blue-black beetle about one-fourth inch in length and has passed the winter in the adult stage secreted under leaves or rubbish. Their work during the spring lasts for about a month, then they gradually disappear. During this time, however, they have deposited eggs for another generation and these produce numbers of small, dark brown larvæ which feed upon the leaves, affecting particularly the upper surface, giving them a badly spotted appearance, or if very numerous, completely riddling them leaving only the ribs of the leaves. If numerous enough to entirely strip the vines the loss both in fruit crop and growth of the vine is very serious. The larvæ complete their growth in about a month and then leave the vines and enter the ground, making small compact cells in which they change to the pupa stage. They remain in this stage for two or three weeks and then issue as beetles when the injury to the vine again begins, but, unless the vines have been badly stripped before, the attacks on the foliage during this part of the season is not very serious. These beetles survive the autumn and winter and appear in the spring to begin their attacks on the first foliage. This insect has never been as destructive in this State as reported in some adjacent States, but within the last few years it has attracted considerable attention and is likely to increase and become a troublesome pest wherever grapes are grown in any number. The species is not difficult to destroy as the beetles and larvæ both work in an exposed condition on the leaves and spraying with London

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purple or Paris green, in the usual proportions of one pound to 200 gallons, will destroy them readily. It is also recommended by some to strew air slacked lime or unleached ashes around the infested vines and to remove and destroy the leaves and other rubbish around the vines which might furnish shelter for the beetles. In early spring when the beetles begin their attacks they may be beaten from the vines and collected upon sheets and destroyed which will prevent the damage that would occur if they must feed upon the poisonous leaves first.

Grape vine leaf hoppers (*Typhlocyba vitis*) appear somewhat early in the season and affect the vines by puncturing the leaves, sucking out the juices and causing them to turn whitish and sometimes to become shrivelled or withered. Their attacks are generally more noticeable on the thin leaved varieties and of little consequence on the thicker leaved forms, such as Concords and Worden. The leaf hoppers pass the winter in the adult state, secreted under leaves and rubbish and begin their attacks on the vines almost as soon as the leaves are expanded, also depositing eggs which produce numerous young that develop during the summer months, the numbers increasing rapidly until the vines may be so thickly infested that a swarm of the hoppers will rise upon the least disturbance of the leaves. This insect is not very easily treated since it is not affected by any sprays upon the leaves, but any destructive agent must reach the leaf hoppers themselves in order to be effective. Spraying with kerosene emulsion, taking pains to reach the under sides of the leaves, is perhaps one of the most effective plans and is particularly useful while the insects are young but less likely to affect the adults which take wings quickly when disturbed and may possibly escape the spray. A plan which has been recommended somewhat recently is known as the shield method and consists in covering a canvas or pasteboard stretched on a frame with tar and carrying this along the rows of vines. The leaf hoppers are disturbed by shaking the vines with one hand, while the shield is held in such position that the insects will hop or fly against the tarred surface.

The Grape Phylloxera (*Phylloxera vastatrix*) is probably the most serious and widely distributed pest of the vine, but fortunately has not shown itself a very serious pest in this State. Nevertheless the galls are very frequently to be noted upon the leaves of Clinton and other thin leaved varieties and it would be improper to disregard this species in any consideration of the grape insects of the State. This species exists in two forms, one affecting the roots the other the leaves, and it has been shown that these two forms are simply different conditions of existence for the same insect. The leaf or gall-making form occurring during summer and early autumn, while the root-inhabiting form is found upon roots during autumn, winter and spring, and in some numbers also during summer. The root form is the more destructive one, producing galls and deformed growths on the roots, causing them to swell and finally decay. The round of life may be briefly quoted from Saunders, as follows:

During the winter many of them remain torpid; at that season they assume dull-brownish color, so like that of the roots to which they are attached that they are difficult to discover. Soon they begin to deposit eggs; these eggs hatch, and the young ones shortly become egg-laying mothers like the first, and, like them, also remain wingless. After several generations of the egg-bearing lice have been produced, a number of individuals, about the middle of summer, acquire wings. These also are females, and they issue from the ground and, rising in the air, fly, or are carried with the wind, to neighboring vineyards, where they deposit eggs on the under side of the leaves among their downy hairs, beneath the loosened bark of the branches and trunk, or in crevices of the ground about the base

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of the vine. Occasionally individual root-lice abandon their underground habits and form galls on the leaves.

In treating this species, attention can be given to either the gall form on leaves or to the root form, the destruction of one form naturally affecting the abundance of the other. The infested leaves may be collected and destroyed; and if there were no root forms occurring during the summer, this might be quite effectual. The methods which have been most successful in use, however, seem to be those directed to the root form, and probably the most extensively used method is the bisulphide of carbon treatment. This consists in a subterranean fumigation, and is accomplished by making a hole in the ground to a depth of a foot or more and pouring into this two or three ounces of the liquid and then closing the hole so that the fumes will distribute themselves through the soil.

The Eight-spotted Forester (*Alypia octo-maculata*) sometimes appears in destructive numbers in the latter part of summer, the larvæ being banded caterpillars, while the moths are black with two white spots upon each wing. It is not very often that this species occurs in destructive numbers, and when it does it may easily be destroyed by an application of London purple or Paris green, this being perfectly safe to apply for the brood appearing in June and July; treatment at this time will prevent any injury from the second brood, which appears in September.

The Grape Berry Moth or Grape Seed Caterpillar (*Eudemis botrana* Schiff), has not until recently been known as a destructive species in this State, but I have learned from a Mr. McDonald of Des Moines, that a caterpillar which evidently belongs to this species has caused much injury in his vineyard during the past season. As it is a species which will prove very troublesome if it becomes abundant a short notice compiled from the works at hand will be in place. The insect is an imported species and has long been injurious to grape culture in the south of Europe. The larvæ begin to appear in July when the injured grapes show a discolored spot where the worm has entered; the larva feeds upon the pulp and sometimes upon the seeds and if a single grape does not suffice for its growth two, three or more are fed upon, usually being fastened together with silken threads. It is said to pupate upon the vines, folding a leaf as protection. Two broods are said to occur each season but the injury is not observable except during autumn.

Saunders says: "As it is probable that most of the late brood pass the winter in the chrysalis state attached to the leaves, if these were gathered and burned a large number of the insects would perish. The infested grapes might also be gathered and destroyed. This insect is attacked by a small parasite, which doubtless does its part towards keeping the enemy in subjection."

DISCUSSION.

PROF. OSBORN: As to when to spray: about one week after the blossoms have fallen and again about one week after that and sometimes a third spraying about a week later. With plums, as soon as the insect is discovered. White arsenic is apt to injure the foliage, besides it is dangerous to handle. Kerosene oil should always be diluted, about two per cent. is sufficient. Those wishing to secure information in regard to the ingredients and mixing for spraying, can address me at the Experiment Station, Ames, Iowa.

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Moved by Mr. Strohm that Mr. H. W. Lathrop be made a life member of this society. On motion, Mr. Henry Strohm's name was added. Both motions carried.

On motion, Prof. Osborn's name was placed on the list as an honorary member of this society for 1894, on account of his interesting and instructive lecture and lantern display of photographic views from old Mexico.

THE PROPAGATION AND CULTURE OF ROSES.

BY MRS. J. I. BAILEY, WEST BRANCH.

In cultivating roses, the writer has never experienced the trouble that many people do, from slugs or any other enemy. Believing that the yellow June rose is a breeder of slugs, I never allow one to grow on the place, but treat them like weeds, and if one should get the start in any way, have it dug out, root and branch. We have a hedge of monthly roses, eighteen inches apart, sixty-four feet long, that afford abundance of bloom the entire season, and this year, after the frost had killed everything else, many of these roses were in bud and bloom. About half of this hedge are hardy and stand our ordinary winters well. The tender ones are lifted after frost and taken to the cellar or conservatory. I buy my roses mostly in dollar collections, getting twenty roses for a dollar. The class of roses I get are Catharine Mermet, Bride, Perle des Jardins, Queen, Madame Swartz, etc. Many of the finer roses when selected individually will cost twenty-five cents apiece. I prefer these collections to many of the more expensive plants bought singly.

All our roses, both monthly and June, are planted in cultivated beds, enriched thoroughly with well rotted cow manure with a few bushels of sand mixed well together. Weeds or grass in the beds should not be tolerated. We have many June roses and among them Moss and Hybrid Perpetuals. This row of roses furnishes flowers in their season abundantly; many bushes will produce a bushel of bud and bloom at one time. The secret of this profusion of bloom is severe pruning. They are cut down as soon as the blooming season is over to within eighteen inches of the ground every year.

It may be added that cuttings may be made at almost any time in the summer. Whenever a shoot has developed a flower bud it has arrived at the proper degree of hardiness necessary for cuttings. Short cuttings are preferable to long ones; cut two to four inches long and take off the leaves from the lower end, leaving only three or four leaves at the top. Some writers advocate planting roses in clay soils, but I can not speak of this from experience.

DISCUSSION.

MR. HOYT: I have found that strong soap-suds sprinkled upon rose bushes will kill the slugs.

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THURSDAY AFTERNOON.

MR. GREEN: I offer five chrysanthemum plants to be sent by mail next spring to every person who becomes a member of this society at this meeting, and also a flower badge to every member who attends our next meeting at Wapello.

HORTICULTURE AT THE WORLD'S FAIR.

BY PROF. N. E. HANSEN, AMES,

The limits of this paper will prevent giving even a very brief outline of the above subject. However, a few extracts from notes taken during two trips to the great exposition may prove of interest.

Fruits as modified by climate.—The marked modifications of apples by varying climatic conditions was one of the most interesting revelations of the pomological display. Size, color, shape and quality were all affected. Time did not permit a full study of the subject. In general, the apples of the northern states were more brilliant in coloring than those of the southern states, of which the color, though deep, was inclined to be dull. The apples of Iowa, Minnesota, Wisconsin and Canada were remarkable for high color. Arkansas apples averaged perhaps largest in size. Washington and Oregon apples were remarkable for large size and high color; and oblong apples, such as Yellow Bellflower, with corrugated basin, showed this characteristic in a much more marked degree, the corrugations being deeper and the calyx larger. The tendency seemed to be for the fruit to become elongated, and the basin of many varieties, said to have a perfectly smooth basin in the east, acquired marked corrugations, and the basin also became deeper. Some specimens of Yellow Bellflower from Kentucky showed no corrugations.

In the government building were shown a large number of wax casts of leading varieties of apples as grown in different states. The models were faithful copies of nature, and were made by one of our veteran Iowa horticulturists, Col. G. B. Brackett. A few examples: The Ben Davis from

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Maine, New Hampshire and Connecticut were small; from Mills county, Iowa, large; from Arkansas, enormous. It will be noted that Ben Davis is native of Kentucky. The Baldwin, a native of Massachusetts, as grown in Maine and Massachusetts, was much larger than as grown in Michigan and Colorado, the basin of the one from Washington was much corrugated. Tallman Sweet, a native of Rhode Island, from Colorado was larger than from Maine, but showed only faintly its characteristic lines from cavity to basin. Minkler, a native of Illinois, from Arkansas was much larger than an Iowa specimen. Northern Spy, a native of New York, from Arkansas was enormous, next in size were those from Iowa, Colorado, Michigan and New York. Rawle's Genet, a native of Virginia, was largest from Colorado and had more color, Iowa next in size, New Mexico the smallest. Porter, a native of Massachusetts, was small from Maine, but very large from Arkansas. These were single specimens, and it would be of great interest to ascertain to what extent these differences hold good for the crops as a whole. It is certainly true, as shown by these wax models, and by the extensive displays of fresh fruit from the various states, that great changes are wrought in the external characteristics of apples by varied soils and climates. The pomologist who wishes to acquire more than a local knowledge of fruits, must study them in a comparative way, and take due cognizance of these modifications.

I cannot attempt any generalization, except that southern apples are inferior at their north limits of growth, and northern apples are inferior at their south limits of growth. The belief is common that fruits do best in their natal home, but it appears quite evident that there are many exceptions to this rule. Many varieties appear to attain their highest development far from the region of their origin. This leads to the reflection that breeders of fruits, in case their new seedlings do not prove entirely satisfactory, should not hastily condemn them as entirely worthless. Other sections may be well adapted to their successful cultivation. Some hybrid American grapes, found to be of no value for general cultivation in this, their native country, are very popular in Europe.

Iowa fruits and Russian apples.—The magnificent display of Iowa fruits has already been described in the report of the State society. The exhibit of 427 varieties of apples, 59 varieties of plums, 25 varieties of pears, 30 varieties of grapes and 10 varieties of peaches, showed to the assembled multitudes that Iowa is a land of fruitful orchards and vineyards.

I made careful descriptions of a large number of Russian apples and their American seedlings from Iowa, Wisconsin, Minnesota, Canada, Washington and other states. Their brilliant coloring and average large size were remarkable. Without these representatives of the East European race, the apple exhibit from the nortnern sections would have been very slim indeed. The large number of American seedlings of this race indicates a great future. They already play an important part in our prairie pomology.

In the Iowa exhibit were shown a number of plates of new Bokara peaches, sent in by John Wragg & Son, of Waukee, and A. Snyder & Son, of Center Point. Bokara No. 3 was the largest, one of them measuring seven inches in circumference. It did not rot easily, being inclined to shrivel rather than rot. I saw one plate in good condition, September 26th,

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which had been exhibited at the Iowa State Fair the first week in September. Fruit yellow with red cheek, skin tough, flesh of good quality, a perfect freestone. Bokara No. 2 was nearly equal in size; Bokara Nos. 4 and 6 were smaller; all yellow with red blush, of good quality and perfect freestones.

A large number of varieties of native plums were displayed by several of the northern states. The largest and best display was made by Iowa. Fine plates of De Soto, Wyant, Wolf, Rockford, Stoddard, Hawkeye, Pottawattamie, Purple Yosemite, Ocheeda, Weaver, etc., were shown. Two of the largest native plums on exhibition were from Iowa, Stoddard and Hawkeye, both Iowa seedlings.

DeWain Cook, of Minnesota, exhibited four seedlings of Wolf, one of which was smaller, while the other three were equal or superior in size. This indicates prepotency on the part of the Wolf.

Spraying.—In the New York state exhibit were shown some valuable object lessons in spraying to destroy injurious insects and fungi. Plates of very fine specimens of several varieties of apples were shown by G. T. Powell, with the following card: "These varieties are peculiarly liable to attacks of apple scab and are often entirely unsalable. These have been thoroughly sprayed with Bordeaux mixture and Paris green. High fertilizing accounts for the brilliant color of the fruit." The varieties were Cranberry Pippin, Fameuse, King of Tompkins County, Fall Strawberry, Esopus Spitzenberg, Twenty Ounce, Rhode Island Greening, Pound Sweet.

The New York state experiment station exhibited four plates of average specimens of White Doyenne and Seckel pears. The unsprayed White Doyenne pears were small, much scabbed and unsalable. Those sprayed with Bordeaux mixture were larger, smooth and free from scab. The unsprayed Seckel pears were very small and badly scabbed. Those sprayed with Bordeaux mixture were larger, smooth and showed no trace of scab. Similar good results have been obtained recently at the Iowa experiment station by Prof. L. H. Pammel in spraying with copper salts for powdery mildew and leaf spot disease of the cherry, spot disease of currants, leaf blight of pear and other fungus diseases. The freedom of the Russian apples from scab of leaf and fruit suggests their value as the progenitors of a race of scab-proof varieties suitable for all sections where scab is prevalent.

Sports of Trees and Plants.—Variations in plants originate in two ways, by seedling variation or by bud variation. Both are termed "sports" in garden parlance. A multitude of striking examples were observed, such as variegated foliage of all descriptions, and weeping, pyramidal, upright, dwarf and other unusual habits of growth. Fine specimens of Tea's Weeping Russian Mulberry were seen. In early July I saw them bearing a good crop of black mulberries, of fair size and quality, which were ripe and dropped at the touch.

In Europe horticulturists have been on the alert for sports, and innumerable varieties of common forest trees have been obtained, all of more or less value for ornamental planting. Some species are much more variable than others. In the nursery exhibit on the Midway Plaisance were seen at least twenty-five different sports of our common Arbor Vitæ. In the displays by Geo. Pinney and D. Hill were shown all the different forms, such as golden, white-tipped, golden-tipped, compacta, globe-headed, dwarf, pyramidal and

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Siberian. Prominent among them was the Little Gem, of very dwarf and compact habit. A specimen seven years old was but one foot in height. This is desirable for a dwarf evergreen border. The Little Gem was originated by Robert Douglas, of Waukegan, Illinois, and I saw the original tree in my visit to his nurseries in July. It was about twenty-one years old and eighteen inches high. Mr. Douglas has originated and introduced a number of other valuable varieties of common American Arbor Vitæ, such as the golden, white-tipped and pyramidal, which are all valuable for lawn planting. It shows the decided tendency of this species to vary when grown from the seed. These seedling sports are not always permanent, the tree often reverting to the normal type in a few years. Mr. Douglas' experience has been that they often revert at about four years of age; after the sixth year they generally remain fixed, and at ten years, from the seed, the sport may be considered permanent and fixed and it is safe to propagate.

Recent Floral Development.—There was abundant opportunity for the study of the efforts made in the past few decades in the improvement of flowers.

The hundreds of beautiful varieties of pansies, many of them enormous in size of flower, showed the effect of cultivation on the little wild heart's ease of Europe in the past eighty years. But even now the most careful selection of plants for seed must be practiced in order to keep the variety pure, as a greater or less proportion of the plants always revert to the earlier and less desirable types.

The old Indian Shot or Canna, has been greatly improved in the last twenty years. The many choice named varieties were shown in large numbers, and formed one of the leading features of the outdoor fall display.

Dahlias and gladioli in hundreds of named varieties, illustrated still further the results of persistent effort in floral development.

The annual flowers were also very striking examples of this work. Many of our wild prairie flowers should be subject to a similar course of cultivation, selection, crossing and hybridizing.

The pomological display showed the result in developing fruit plants.

Collections of wild fruits from Illinois and the northwest territory in Canada, suggested that with these we might make similar advances.

Flower Beds.—The many choice flower beds were much admired. Some of the combinations observed were as follows:

Center of yellow cannas, border of Marshall MacMahon geranium. Fine.

Center of Madame Crozy cannas, border of Madame Salleroi geranium. Fine.

Dark brown leaved Ricinus in center, Caladium border next, outside border of dark brown coleus.

Center of Madame Salleroi geranium, border of dark red Achyranthus.

Cannas in center, border of marigolds.

In connection with this list, it may be of interest to note the following, observed in Washington Park, near the entrance to the Midway Plaisance:

Center of Madame Crozy cannas, border of dark red coleus.

Center of coxcomb, border of centaurea. Also seen in ribbon beds. The white and red made a fine combination.

Center of red geraniums, border of sweet alyssum.

Center of verbenas, border of centaurea.

Center of red cannas with dark foliage, border of yellow coleus. Fine.

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DISCUSSION.

PROF. PAMMEL: It occurs to me that the scab appears less upon the summer and fall apples than upon the winter apples.

MR. BRANSON: I think the variety determines the amount of scab rather than the fact of its being summer or winter fruit.

THE COMMERCIAL PRESERVATION OF FRUITS.

BY PROF. J. L. BUDD.

The time has come in the development of peerless Iowa when we should take under consideration some of the modern advances in fruit preservation by cold storage, drying and canning.

Cold Storage.—In 1881 Prof. C. G. Knott, an expert on food preservation, wrote: "Machines which are capable of freezing water may in certain circumstances be much more efficiently employed to produce cooling without freezing. In many cases indeed the production of ice would be a mere waste of labor. There seems little doubt that if a simple, economical, and thoroughly efficient means of cooling were discovered, houses would be cooled in warm weather with the same care and regularity with which they are when heated. At present, however, the manufacture of ice and the production of cold are in their infancy."

Since this was written much progress has been made. Cold storage rooms, without the use of ice, are now common in every leading fruit market and in every region where fruit growing has attained commercial importance.

Cold storage chambers on ocean steamers now also permit the transportation of fresh meats and fruits from the most distant parts of the earth. The refrigerator cars in like manner carry fruits across the continent in perfect order. Indeed, the present outlook favors the belief that *home cold storage*, in connection with home cooling during the heated period, will in the near future be furnished at low rates.

All attemps to preserve apples in ice-cooled rooms have not been satisfactory for the reason that the apples lose color, turn black, and begin to decay as soon as they reach the market or the home. But the rooms cooled with ammonia machines will keep the Oldenburg apple six months, and when it comes out for sale or use it retains its color, is improved in flavor, and holds up in a warm room for many days. At the Columbian Exposition last June and July such late summer and fall apples as Oldenburg, Alexander, Wolf River, Fameuse, McIntosh Red, Zuzoff's Winter, Hibernal and many others, drew out much comment and discussion for the reason that they held

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up in the warm hall as well, and in some cases better, than tough winter apples.

As to improvement in flavor, at the meeting of the American Horticultural Society last winter in Chicago the Oldenburg apple was on the Tremont House tables every day. Some of the southern members doubted its identity on account of its mild acidity and tenderness of flesh. At the same time the members were astonished with the soundness, high color, and quality of northern fall apples, as they came from cold storage on South Water street.

Mr. Newhall, of the Refrigerator Company at 101 South Water street, furnished the Iowa State building and the Iowa fruit tables with ten barrels of Iowa grown Willow apples, put in cold storage in 1891. In October of 1893 these apples held up on the fruit tables fully as well as the Willow of 1893.

Mr. Newhall said that he had had a long experience with ice-cooled storage rooms, but it was far from satisfactory. With the modern ammonia system, he said that there was no appreciable change for months in the temperature and moisture of the air.

The ruling price of handsome fall apples in October, 1893, in Chicago, was fixed by the known facts in regard to cold storage. As an instance, Mr. Phillips, of Wisconsin, stated that Lubsk Queen apples brought four to six dollars per barrel to put into cold storage. Their size, beauty and quality will sell them in the spring for five cents each.

As this variety is hardier than Duchess, and equal to it in bearing, it fully illustrates the future of the preservation for winter and spring use of handsome, tender and good fall varieties.

The lesson of the past two years in Chicago and Milwaukee is, that the varieties of tough winter apples, that keep because they are dry and tough, will be superseded by such tender-fleshed and juicy sorts as Wealthy, Zuzoff's Winter, Red Aport, Lubsk Queen, Gipsy Girl, Fameuse, Wolf River, and other hardy northern varieties. The cold storage plants will, in the near future, be found in every neighborhood where apples are grown in such quantity as to glut the local market. These plants will not be confined to apple preservation; we would be able to hold our grapes and other fruits until the flush season was over.

I need not say that if New York can provide cold storage and refrigerator cars to send her grapes to the west, we can surely afford to hold our own supplies for later use, thus saving freight, go-between charges, etc., that the New Yorkers must pay.

The aid of such plants for the holding and shipping of our small fruits should also be considered. This is illustrated by Parker Earle's plants in starting his great small fruit plantations at South Pass, Illinois, and marketing the crop in northern cities; and still better by Mr. Earle's growing, holding and shipping small fruits from the Gulf of Mexico to northern markets.

In detail the subject is too extended for a brief report. Cold storage plants without the use of ice in our days, permits an interchange of the perishable products of the world not known twenty or even ten years ago.

Drying Fruit.—We now have evaporators for fruit-drying of many sizes and at prices not heard of ten years ago. In some neighborhoods in north Iowa the Oldenburg is a drug on the market in its season. If dried at home

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in the oven or the sun, the product has not much commercial value. With the use of a good evaporator, on the contrary, the Oldenburg product will bring in any market thirty per cent more per pound than the dried fruit from the tougher commercial apples. As we now have many large smooth iron-clad varieties which will be planted extensively in the near future, we can safely introduce evaporators at many points. The limit to the sale of dried fruit from such apples as Oldenburg, Wealthy, Hibernal, Patten's Greening, and dozens of other sorts we now have at the north, will be as limitless as the sale of our canned corn and tomatoes.

I will only add that chemical analysis shows why many of these iron-clad northern sorts make the best jellies and are best when dried. They really contain more grape sugar and pectose than apples of the grade of Willow, Ben Davis, Stark, Missouri Pippin, etc., and some of them even more than the Jonathan and Grimes Golden. If any one doubts these conclusions he should search the markets for dried apples that will compare favorably for culinary use with the evaporated Oldenburg, Hibernal, or Wealthy.

Canning.—Quite recently the canned corn and tomatoes found in our groceries were put up at Baltimore, in Maine, or at some other far away point. But now we are glad to report that we have canneries of these products that distribute them over the civilized world.

But to this time our canned apples, plums, cherries, and small fruits come from the far east, south or west. Yet the question arises: Is there any state in the union where the small fruits, with methodic care, produce better crops of better quality than Iowa? The apples also that are best for drying are best for canning, and our canned plums and cherries have a rating in Chicago. Mr. Augustine said in Chicago that canned Swedish sloes had a quicker sale than the California prunes and plums, and that canned Early Richmond cherries competed favorably with the best of the Pacific slope. With our present varieties of hardy plums and cherries it is only a question of time to secure local supplies where canneries are started.

We might include fruit jellies, pickles, canned and dried vegetables and other commercial products, put up where lands rate much higher than ours, and even where water rates are extortionate for needed irrigation. But in these hasty notes the only purpose is to direct attention to these neglected industries. The time has now come when our horticultural societies and the press should aid in turning thought and capital into these industrial lines.

TIMBER GROWING.

BY D. F. BRUNER, TOLEDO.

The varied purposes for which we grow trees make great differences in the lists of kinds planted. If we want to grow them for timber only, I would recommend the oak, black and white walnut, white pine, European larch,

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cedars, hickory and ash, with some sycamore, wild cherry and elm. The above are all hardy and are grown from seed. The seed should be gathered as soon as matured; all nuts should be stratified, or otherwise kept in boxes mixed with leaf mold and sand, and kept in a cool place or buried outdoors where no water can get to them. They should be kept just moist enough so as not to shrivel or dry out. I would plant as early in the spring as I could get the ground in good order. European larch and evergreen seed I keep dry in sacks in the cellar till spring. Just before it stops freezing nights, I put it in shallow boxes mixed with sand, and wet them, and let them freeze several times, mixing them up every few days, and plant them as soon as the ground is in good order to work. Elm, maple, and wild cherry do best planted as soon as the seed is thoroughly ripe, which with elm is in the spring when the woods begin to look green; soft maple about the last of May or first of June. Hard maple can be planted in the fall or kept in boxes mixed with moist leaves, and planted as early in the spring as possible. The oak, walnut and hickory do best if planted where they are to stay. The elm, maple, and all evergreen seed should be planted in seed beds and transplanted in groves after they are from one to three feet high. It is absolutely necessary, while the trees are small, to cultivate them all and keep clean from weeds and grass.

In transplanting evergreens to make them grow we must get all the roots possible, and not let the roots be exposed to the sun or dry winds in the least. A good way is to go to the nursery with the wagon with side boards on the box, then put your trees as soon as dug in an upright position, packing them tight with all the dirt to the roots you can afford to haul, with a little wet straw on the last exposed roots; take them where you want to plant them, have the ground well prepared and plant them carefully and they will grow as well as soft maple or willow. After transplanting they should be cultivated for several years. The above rule for transplanting is good to be observed for all trees, especially for fruit trees. The proper time for trans planting all trees is in the spring as soon as the leaves begin to come out. This, of course, varies with some trees; for instance, the European larch cannot be transplanted too early, whereas the catalpa can be transplanted some seasons as late as the first of June. I would plant trees for groves and timber purposes not more than four or five feet apart each way and cultivate for a few years, and after the trees need more room, thin them out, as the poles can be used for fuel or other purposes. When trees are planted thick on the ground they need no pruning except, when, like some walnut trees, they have some strong side limb which can be cut off while small, but I do not like to take large limbs off of walnut trees, as it most surely makes an unsound spot in the tree, for a sound walnut knot is worth more than a dotted or rotten spot in a walnut log.

Another item of some importance I would mention in timber growing, is the pasturing of groves and timber lots. It is an absolute injury to pasture any kind of timber while young; it will injure trees twenty or thirty years old to pasture them constantly or too severely. How often we see beautiful natural or artificial groves pastured and pruned to death. If we want to to get good, straight, sound timber, have it thick on the ground and let it prune itself.

We also see many beautiful natural groves spoiled by chopping out all

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the strongest, best and straightest timber, letting the poorest, scrubby, little trees stand, which are most certain to stand still for many years or die out. A better way, if you have to have some of the best timber, is to chop it all off till you get enough, close to the ground, and in fifteen or twenty years you have a grove of young timber that you will feel proud of, and it will be much better than the little, scrubby timber, which would shade the under growth and not let it grow thick enough for a good grove.

In regard to planting timber for wind-breaks and shelter-belts or ornamentation, we cannot go by rules as to where and what to plant, but trees for screens or wind-breaks should not be too near your houses or stock yards. Nut trees should not be planted too close together to insure good bearing, though the American chestnut will do better planted close together, and then when nearly old enough to bear, thin them out enough to give them room; or a better way is to plant some other trees between them and cut them out when the chestnut trees need all the room. The chestnut does not bear pruning well in our climate. In my opinion the cut-leaved birch, hard maple, American basswood or linden, European larch; and among evergreens, the Norway spruce, white spruce, white pine, balsam fir and cedars are among the finest trees for ornamentation, though others are probably equal in beauty. The above mentioned are all hardy almost all over Iowa, and are trees that will add beauty to our home and comfort in our surroundings.

Any one who has made an investigation will come to the conclusion that our forests of the north, both of pine and hard wood, are vanishing like wax before a flame, and that our forest supply in the north, according to the population of our northern states, is not one-third what it was even twenty years ago. Go to Minneapolis or any other place in the north where saw logs are collected, and we can see how small and knotty the logs are compared with what they were twenty years ago. It is no wonder we get so much poorer lumber than we got then, so we must come to the conclusion that our timber resources from the north will after a brief period end. How is it in the south? The investigation of our southern pine forests and the management of their timber resources, leads us to the conclusion that we are already drawing on their resources, involving their extinction. Great as the present demand for southern timber is, the ever increasing draft will exhaust the supply in a comparatively short period.

Well, we have large forests in Oregon and Washington. But are not the greater part of the civilized nations of the world already depleting those grand old forests? Besides, many of our prairie states are getting shingles and other lumber from them. So it will not be many years, at the present increasing rate of demand, till those large cedars and pines will be gone. It is, then, useless to argue that it is not of the utmost importance that every farmer and horticulturist who can, should plant trees of the best timber varieties. Not only should individuals plant trees, but the states and the United States should make provision for the planting, raising and protection of forests of the most valuable timber for future generations. It would ameliorate our climate, and be one of the many means of making us a happy, contented nation.

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DISCUSSION.

MR. BRUNER: I think something should be done by our legislature to protect our remaining native timber, and some extra inducement offered for the planting of groves. The coal in many parts is nearly exhausted, and we shall have to depend more and more upon wood for heating purposes. The State offers a premium of $100.00 deduction from the assessment of each acre of artificial groves, but this does not seem to stimulate the land owners to any great extent

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NEW SEEDLING PLUMS.

BY H. A. TERRY, CRESCENT.

In making a list of seedling plums it will be necessary to include some varieties that have been in cultivation several years or the list might be quite short. In the following list of varieties a large part had their origin in western Iowa. Some of these are accidental seedlings—that is, were found growing in a wild state, and others have been produced by crossing in cultivation. It is possible that some varieties that do well and that are very valuable here, may be nearly worthless in other portions of the country where the soil and climate are different. But I give their value as they are grown here.

Milton.—This is the earliest variety that I have ever grown—tree a good grower, hardy and very productive; fruit about medium in size and color a brilliant red, quality good. A fine market variety; seedling of Wild Goose.

Charles Downing.—Tree a spreading, low grower, but an immense bearer of large, light red fruit, of fine quality which ripens in August. Succeeds best on peach roots. A seedling of Wild Goose.

Crescent City.—Tree a vigorous, upright grower, and a fine bearer of fruit of large size, dark red color; having something the appearance of Miner, its parent. It is much more productive, and fruit of better quality than Miner.

Marcus.—This plum originated in Cherokee county from seed of fruit found growing wild on Little Sioux river. Tree a vigorous grower, with fruit of large size, dark red in color, and of excellent quality.

Holister.—Originated in Cedar county, Iowa, by a man named Holister. Fruit of medium size, color clear, bright red and of excellent quality. Of Chickasaw type.

Champion.—Tree upright and vigorous grower. Fruit large, dark red, good quality and very late. This is a good market variety. Seedling of Hawkeye, probably fertilized by Miner.

Hammer.—Tree perfect in every way. Fruit large, dark mottled red,

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perfection in quality, a seedling of Miner, pollenized by some *Americana* variety.

Dr. Dennis.—Tree rather upright and a vigorous grower, healthy and hardy, and very productive. Fruit above medium, light red, a fine market variety. Seedling of Hawkeye.

Prairie Flower.—Originated in Missouri, and is said to be a seedling of Miner, which it much resembles both in tree and fruit. A little larger than Miner and much more productive, and excellent in quality. Rather late.

Esther.—Medium to large; dark red, fine quality, very productive. Tree an upright, strong grower and very hardy. Seedling of Miner. Late.

Freeman's Favorite.—A seedling of Wild Goose, with fruit of the very finest quality, but no better bearer than its parent. Fruit is large, and very showy; rather early; tree a good grower. Every orchard should have a few of these trees.

Col. Wilder.—Another seedling of Wild Goose, and somewhat similar to the Freeman's Favorite in fruit, but tree is more spreading in habit; fruit of excellent quality.

Jones.—An accidental seedling that originated with Mrs. H. Jones, of Pottawattamie county, Iowa. Tree a very vigorous, strong grower, and an immense bearer of medium to large fruit of good quality. A peculiarity of this variety is, that the fruit will remain sound for ten to fifteen days after ripening. This is of the *Americana* family.

Van Deman.—Tree vigorous and hardy, and quite productive; fruit large and of good quality, light red. A seedling of Hawkeye.

Silas Wilson. — Tree a vigorous grower, somewhat spreading; very hardy, and a good bearer of fine large, red fruit, of good quality; season medium early. Seedling of Hawkeye.

Lillie.—This tree bore its first crop of fruit the past season. Tree only four years old from seed. Tree a strong upright grower and bore one-half bushel of as fine fruit as I ever saw. Fruit very large, light mottled red and perfection in quality. It is supposed to be a seedling of Van Buren. Should it continue as it starts out, it will be one of our most reliable varieties.

Baldwin.—This variety originated on the Baldwin farm near Council Bluffs. Tree a strong grower and good bearer. Fruit medium to large, dark, purplish red, and of good quality.

The Cook's Choice.—This is an accidental seedling in *Americana* family, not a heavy bearer, but with fruit of good size and of the very finest quality for canning or other culinary use. Tree is a strong, healthy grower, and is worth planting on account of the quality of the fruit.

James Vick.—This is a seedling of Wild Goose and bears large fruit of excellent quality, and light red color. Tree low and spreading, and has the fault of breaking and splitting down with weight of fruit and foliage in case of storms.

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TWO HUNDRED YEARS OF PROGRESS IN HORTICULTURE

BY BLAIR WOLF, TIPTON.

The written history of horticulture is comparatively of recent date. Tradition speaks of the grapes found by the adventurous Northmen in the wilderness of what is now known as the shores of New England. The appetite of the Spanish American conqueror craved precious metals more than luscious fruit, and the records of their discoveries make no special mention of the abundance and variety of the native tropical fruits of America. If a passenger of the Mayflower had brought an apple seed and planted it beside Plymouth Rock, and it had brought forth fruit, his or her name would be familiar to every school boy to-day. We are sorry to say that we know so little of the fruits reared by our revolutionary sires, or whether our grandfathers' pockets were filled with luscious Rambos and Pippins or common seedlings. Many who eat the cultivated fruits of the present day know but little of the character of the native fruits of the woodland and prairies. The wild plum and crab apple of the eastern States bore no comparison to those found in the groves and by the streams of the Mississippi valley. There were large and small and early and late varieties. No plum has yet been successfully fruited in central and northern Iowa that is superior in every respect to the best of the native varieties. As late as fifteen years ago our good wife procured some native crab apples as large as Transcendent, from which she manufactured as good jelly as from any tame apples. Another neighbor lady has a good quality of jelly of this years' production. Wild grapes were also abundant. Many of the hazel thickets furnished a fine quality of strawberries. Other kinds of fruits less valuable also contributed to furnish variety to the table of the early settler. Of the first varieties of tame fruits planted in this State few remain, but the persevering fruit grower has grown rich in experience, and his lessons are becoming capital for the commercial grower. The fact that Iowa fruit took the first prize at the Centennial exhibit is worthy of remembrance, and should be a stimulus to the horticulturists of our great State for all time. Many of our free-holders are being convinced of the fact that Iowa can produce fruit equal in quality and quantity with her neighboring sister states of the same latitude. The fruit grower of to-day is making valuable history for the future, and his experiments and experience will help to form

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the written and unwritten history of practical horticulture. He is the servant of more than one generation; and

He who plants a tree or vine
Adds wealth as rich as from the mine,
Or gifts from out some basket sweet
And casts them at his children's feet.

The fairer hand that plants the rose,
And twines the tendril as it grows,
Brings fragrance unto all around,
Within the pleasant homestead found.

Life's sweetest, purest, happiest hours,
Are spent in childhood's summer bowers,
Ere autumn's blast and winter's cold,
Proclaim the fact we're growing old.

While reaching up to man's estate,
There's nothing small we prize so great,
To crown with joy the passing hours,
As luscious fruits and fragrant flowers.

While passing o'er life's troubled way,
And out into the world we stray,
Choose in the yard some sunny spot,
And plant the blue *Forget-me-not*.

THE MIDWAY PLAISANCE OF HORTICULTURE.

BY W. M. BOMBERGER, HARLAN.

The greatest attraction ever offered to the people of the western continent has been the Columbian Exposition. Thirty-three millions of dollars was expended on the buildings and grounds alone. This sum is to almost all incomprehensible, as when a count is made of such great denominations it has been found by our national census takers only practicable to do it by machinery.

This great sum is but a small part of the cost of the exhibits. In fact, the whole earth and every representative nation placed her best in them and on these grounds. Not only the nation upon whose territory the sun never sets appears here with all her wealth and power, but the lowliest governments proffered their best. Every quarter of the globe brought its treasures here, not only the people from the most distant north, but even the islands of the seas brought their spices, teas, rich ivory carvings, and even idols for the curious and inquisitive gaze of sight seers of the western world.

France appeared with her exquisite taste in human adornment with pearl-bedecked dresses, laces worth a thousand dollars a yard, Germany with delicate instruments for the dissection of the minutest microscopic parts of the tiniest insects, and huge Krupp guns that are the wonder of the world. But the principal power in the new world outdid all the

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great nations of earth in not only lavished expenditure on the buildings, but in every exhibit she and her states displayed with a marvelous largeness the products of all departments of human labor, skill and science and her fields that put all else in the back ground. The magnitude of the buildings, the architecture that represented every phase of ancient and modern building, even including the Aztec hut and western dug-out, cast a spell over sight-seers till there was a general silence on the part of all.

The magnitude of the lake or almost inland sea seemed to cast a deeper spell of silence on the great multitudes of from a quarter to a half million of people that moved silently each day, and viewed the great fair. On this spot agriculture poured her finest and richest products, grains, grasses, fruits. Mechanics, manufacturers and inventors here showed machinery that rivaled the wildest dreams and visions of the old prophet Ezekiel, fiery furnaces suggestive of Tophet, wheels and engines of every power, shape and magnitude, cranes that if they could not move the earth would at least move a part of it, telescopes that reduces distances millions of miles, printing presses and type-setting machinery that seemed to have life, fairy looms that wove wonderful fabrics; here we found man playing with lightning and a complete collection of the wonders of electrical sciences, railroad engines of a hundred tons weight with the possible speed of ninety-seven miles per hour. And here we found the depths of the earth uncovered and mineral wealth of all the earth shown to all people. In fact, here we found instruction and food for thought and opportunity for investigation in every possible line in which it is possible to direct human thought. Now all this was offered and daily seen for the modest sum of fifty cents per day—but a nominal sum when the advantages of such a place are taken into consideration. But like everything else this place had a side attraction, as most things have, in the Midway. This was a long street lined with side shows or minor attractions that in the majority of cases appealed to curiosity and grosser senses, and each attraction appealed for an extra fee. These attractions had some worth to them, as the Ferris wheel, Buffalo Bill and Java village. The watching of the people and a study of the crowds and the effects of the sights on them, was also a most important part of the Fair, but none was more attractive than comparing those that thronged the art building with those that thronged Midway.

As the World's Fair had a Midway, so has horticulture. A study of the horticultural exhibit of the northwest shows that we have had in the near and distant past too much Midway in it. The tendency to plant and grow fruits, plants and flowers for other reasons than profit and pleasure has been too great. For many years it was thought that number of varieties was the most desirable thing, and the chief aim seemed to excel a neighbor in numbers of varieties planted. Later the artistic plate-book appeared, and with this follows exaggerated stories and claims, and planters plant because of a wish to try the exaggerated story of this or that annual introducer of new fruits, and to keep up a market an annual introduction of varieties, whether old or new, is pressed upon the public with remarkable claims as to newness and rarity, and a trade of great profit is each year maintained by a class of introducers that is exceedingly profitable, and they find it profitable to issue catalogues costing thirty to fifty thousand dollars for each edition.

It was possible to find many at the great Fair that walked the grounds

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among and through the great buildings a few days and called it tiresome, and then spent a good week on Midway at a cost of from twenty to fifty dollars and called that doing the Fair. Just so is it possible to find planters who annually buy dollar apple trees, two dollar grapevines, five dollar a dozen strawberries, grapevine raspberries, and tree blackberries, and plant them each year with the most ardent hopes, and have no fruits for family, or much less, for commercial sale. Such planters, in the course of a dozen years, lose enough money to have planted large commercial orchards, vineyards and fruit gardens of all kinds, if they had but taken an intelligent interest in the work, and planted standards which so largely made up the extensive exhibits at Chicago this year. Take the line of apples alone; the principal exhibits from the northern section of the west were, for Wisconsin and Minnesota, Oldenburg and Wealthy, to which was added extensively in Wisconsin the McMahan's White. In northern Iowa and southern Minnesota, Oldenburg and Wealthy; southern Iowa, Jonathan, Ben Davis and Willow. The central and southern Illinois apple district was made up of Ben Davis, Jonathan and Rome Beauty. The fruit interests that are expanding to such great proportions are pushed by intelligent planters along conservative lines as to varieties, and most of the new varieties introduced annually are little planted by them and would not be if trees were made a gift. Yet, as each spring arrives it is possible to find some planter planting the newest horticultural fad or novelty with the same interest and eagerness that a Midway loiterer would pay a quarter or half dollar to see the dead bodies of the Kansas bank robbers, and a four-fifths naked Fiji Islander, when he had already paid fifty cents that gave him the privilege of seeing the best on the entire earth.

VALUE OF THE LADY BIRDS TO HORTICULTURE.

BY MISS ALICE M. BEACH, AMES.

The orchard, farm and garden crops are annually subjected to a heavy tax from their insect foes—a tax which, if expressed in figures, would be simply astounding. The farmer, fruit-grower and gardener are compelled to exercise constant vigilance and wage incessant warfare, or suffer material loss in their harvests. The persistence with which these insect pests have forced themselves upon public attention has gained for them an unenviable notoriety, and has fastened the stigma of their misdeeds and their malicious propensities upon the whole insect world.

Some writers have prevented the "gauzy-winged creatures that dance in the sun," or the "gaily painted butterflies that flit from flower to flower," from coming under this cloud of mistrust and suspicion by alluding to them as harmless things, but the popular notion has only in small degree credited these myriads of creeping, crawling, flying creatures with being positive benefactors to the human race. Even the honey bee, which is acknowledged to be eminently useful in furnishing food for man, has not escaped some of

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this opprobrium, but has been accused of injuring fruits and flowers. In many instances bee-keepers have suffered persecution from their neighbors, who have strongly insisted that their orchards and gardens have suffered from proximity to the bee-hives. It is an established principle in law that all persons are deemed innocent until proven guilty, and fair minded critics will use the same standard before passing sentence upon the bug or beetle. If placed on trial before an unprejudiced jury, many insects could not only easily prove themselves innocent of the supposed crimes or misdemeanors, but thoroughly establish their right to be considered benefactors, worthy of recognition and protection; especially is this true of the Lady-birds, or Coccinelids.

This whole family, so far as observed, is almost exclusively carnivorous, feeding entirely upon some of our most troublesome insect pests. The exceptions are the Mexican bean beetle (*Epilachna corrupta*, Muls), and the, Boreal lady-bird (*Epilachna borealis*, Fabr.) The former has proven destructive to beans in the southwest; the latter is found on the eastern coast, and is injurious to cucurbits. These two beetles are of the same genus. Outside of this genus and these two species the habit of feeding upon plants is seldom exhibited by the *Coccinelidæ*, and the loss occasioned by these exceptional feeders dwindles into insignificance in comparison with the important services rendered by the rest of the family. Prof. Bruner includes the spotted lady-bird (*Megilla maculata*, De Geer), in his list of corn insects, stating that it eats both the blades and the kernels of the growing corn, but he adds: "It also eats plant-lice and by so doing more than repays its injuries wrought."[1]

Most, if not all, of the lady-birds are destructive to plant-lice, scale-insects, and mealy-bugs, and some also feed upon the eggs and larvæ and even soft-bodied adults of other pests. Saunders records ten species as being useful in checking the ravages of scale-insects and mealy-bugs that infest orange trees. He mentions others that prey upon the root-feeding form of the grape phylloxera and upon the apple root plant-louse.[2] Dr. Riley lists six species among the natural enemies of the Colorado potato beetle.[3] Some have been known to destroy the larvæ of the wheat midge and have even attacked the chrysalids of some of our most destructive moths.[4] They are also on record as "foes of the chinch bug."[5] It will be seen that for the whole family the range of food is comparatively small, The different species are usually quite exclusive in matters of diet and limit their bill of fare to a few, sometimes but one or two, species.

California furnishes the most signal instances of the success of the Coccinelids in checking the ravages of injurious insects. The *Icerya* or fluted scale has been a serious hindrance to orange culture in that state, having baffled all attempts at extermination or control. Many growers have been on the point of abandoning their groves, for it seemed but a question of time when the whole citrus industry of the Pacific slope would be completely paralyzed by this irresistible foe. The scale was imported from

[1] Annual Report State (Nebraska) Board of Agriculture for 1889, p. 272.
[2] Insects Injurious to Fruits. Saunders, pp. 413-418; 240; 15.
[3] Potato Pests. C. V. Riley, pp. 40-43.
[4] Report of Department of Agriculture, 1882.
[5] American Entomologist, vol. I, p. 194.

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Australia, where it was by no means a serious pest. The Entomological Division of the Department of Agriculture sent agents to its native home to find what natural enemies kept it in check, and to introduce them into this country. As a result, several species of parasitic and predaceous insects were imported, among which was the Vedalia—a black and red lady-bird—of which it may well be said that it *came*, it *saw*, and it *conquered*, for the fluted scale is either fast disappearing or altogether a thing of the past. Mr. A. Scott Chapman of San Gabriel, California, in reporting to the agents in October, 1889, writes as follows: "Those Vedalia that you brought to my place about the 20th of last March have spread in all directions, although to begin with they followed the direction of the wind most readily. From those four trees they have multiplied so rapidly that in my orchard of three thousand trees, it is seldom that we can now find a fluted scale. * * * Besides having cleaned my orchard, they have spread also to the orchard of my cousin and to my father's orchard; the latter was re-enforced by colonies from Mr. J. W. Wolfskill and from Col. J. R. Dobbins. As my father has some ten thousand trees and almost all were infested, the Vedalias had a grand feast ahead of them, and they have done their work most wonderfully. * * On the Chapman place the Vedalias have cleaned the fluted scale off of one hundred and fifty acres of land. They have taken more than an oppressive burden off of the orange grower's hands, and I for one very much thank the Division of Entomolgy for the insect that has worked a miracle."[6]

The work of our native lady-birds, however, does not lack for testimonials. In 1890 a gentleman procured a number of specimens of the twice-stabbed lady-bird in San Diego county, Cal., and transferred them to orchards in Tulare county, which were infested with the San Jose Scale (*Aspidiotus perniciosus*). They did not appear to increase very fast at first, but last spring (1893) they had increased to great numbers. They came in hosts and completely cleared the orchards of the county of the scales[7]. From the Atlantic coast Mrs. Treat sends a good word for the lady-birds. A few years ago she discovered that one of her fine plum trees was seriously infested with plant-lice, so there was little prospect of its yielding any fruit. Shortly after this discovery her attention was attracted by myriads of little lady-birds which had taken possession of the tree and were making sad havoc with the plant-lice. In a few days they had completed their good work, and in the fall the tree yielded a good crop of fruit. Observing that a small English hawthorn was also being injured by the *Aphides*, Mrs. Treat transferred a dozen or more of the lady-birds to it, and in less than twenty-four hours the enemy was vanquished.[8] It is needless to multiply instances of the valuable services rendered by these little beetles. Enough has been given to show that in them the fruit-grower has an important ally—one that he should know and protect. It would be unwise to rely on them alone in battling with plant-lice or bark-lice, but it would be eminently wise to protect, colonize and propagate them.

The adult lady-birds are generally well known and easily recognized. They are quite convex or hemispherical in shape; in color they are usually

[6] Insect Life, Vol. II, p. 190.

[7] Insect Life, Vol. V., p. 53.

[8] Injurious Insects of the Farm and Garden. Treat, pp. 286-87.

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red or yellow, spotted with black; sometimes black or brown, with or without markings. They hibernate in the winter in any secluded place, and may often be found in large numbers in their hiding places under stones or logs, or in crevices of fences, buildings, and the bark of trees. The eggs are deposited early in the spring, in clusters, often on the under side of leaves, always in close proximity to something that will furnish food for the young larvæ. The eggs of our most common species much resemble those of the potato beetle, from which they may be distinguished by the slightly smaller size, and the smaller number composing the cluster[9]. They hatch in six or seven days.

The larvæ are much less well known than the adults In general, they are about three-eighths of an inch long by one-eighth of an inch broad, oval in front, tapering behind, with the greatest breadth across the thoracic rings. There are three thoracic and nine abdominal rings, each of the former bearing two legs, one on each side. The larvæ of some species, for example, those that feed on the phylloxera or on mealy-bugs, are covered with a white, cottony secretion which serves as a disguise to prevent detection by their foes. Generally, however, they are dark-colored, conspicuously marked with blue, red or yellow spots or bands. Often the markings of the first and the fourth abdominal segments differ from those on the rest of the segments. In some species the upper surface is covered with spines or tubercles. These may be distinguished from the larvæ of the tortoise beetles, which they much resemble, by the absence of spines on the sides. The larvæ are exceedingly voracious, and it is at this stage that these beetles render their most beneficial service. The larval stage lasts from twenty to thirty days. Before pupating the larvæ attach themselves by the end of the abdomen to the under side of leaves, to twigs, or even to the fruit. The chrysalis is broader and less pointed than the larva, and is from one-fourth to one-third of an inch in length. Sometimes the larval skin is cast and remains around the point of attachment. This inactive stage lasts from six to nine days, at the end of which time the adults issue and continue the destructive campaign commenced by them as larvæ. When the food supply is abundant and the conditions favorable, they propagate very rapidly[10].

THE POSSIBILITIES OF OUR NATIVE PLUMS.

BY H. A. TERRY, CRESCENT.

Our native plums, as a rule, seem to be coming into prominence all over the western and northwestern portion of the United States. I am told that there are some portions of Wisconsin and Minnesota where the *Domestica* varieties flourish

[9] American Entomologist, Vol. I., p. 46.

[10] Notes on life history and description are from The Life History and Description of some of our Coccinellidæ, a thesis written by S. B. Clark for the degree of Bachelor of Science, Iowa Agricultural College, 1887.

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and bear fruit, but these districts are somewhat isolated, and even in these localities our natives do equally as well as the others.

It is only a few years since we had only two or three varieties of native plums that were considered worthy of cultivation, and now those same varieties are almost totally discarded to give place to improved seedlings. The writer has been growing fruit on the rich soil of western Iowa for nearly thirty years, and well remembers when the now "Old Miner" was the best variety in cultivation. This was soon followed by the Wild Goose, but the cultivation of both these varieties is now nearly abandoned for that of more productive and better flavored kinds. One of the next to follow was the De Soto, which is still grown largely in some localities; this variety has probably been more extensively grown in years gone by than any other variety in the *Americana* family. This has been followed by such good varieties as Quaker, Weaver, Wolf, Cheney, etc., but all these are accidental seedlings, having been found growing wild in different parts of Iowa, Wisconsin and Minnesota.

The writer has been quite successful in growing seedlings from some of the above named sorts, pollenized naturally, that is, by growing trees of the best varieties near together, and selecting seeds of best specimens of the fruit for planting. Of one lot of seeds planted, thirteen trees were fruited the past season, and six of them are eminently worthy of propagation. It was a seedling from the grounds of the writer that attracted more attention, perhaps, than any other variety on exhibition at the World's Fair. Of course, in this matter, I am speaking of our native plums. In my first series of experiments, if I succeeded in getting one really fine variety out of a hundred, I thought I was doing remarkably well, but for some reason my later trials have been crowned with much better success.

I have never practiced pollenizing the plum artificially, and see no reason why any one may not succeed in growing fine seedlings if they are careful in making good selection of seeds. If spared a few years longer, I expect to see our native plum about the only plum that is grown in all the western and northwestern part of the United States east of the Rocky Mountains. The possibilities of our native plums are immense.

THE FARMER'S BOY.

BY W. S. FULTZ, MUSCATINE.

Whenever we go among farmers and mingle with them in their homes and get into the confidence of the boys, we are sure to find some of them contemplating leaving the farm for a life different to that to which they have been reared. This has always been the case and probably always will be. Farm population is more prolific than that of any other calling, and the boys, as they reach manhood, find that there is no room for the surplus population on the farms of their own neighborhood, and they are compelled to seek an opening somewhere else. Writers on this subject are continually regretting that it is the bright boys who leave the farm and that it is the

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dull ones that remain. This idea is unjust to the great mass of farmers who are to-day just as intelligent and just as bright and are endowed with the same spirit of go-ahead-itiveness as were their fathers before them, or as are their brothers, who have left the farm and located in the cities and towns to follow other pursuits.

If there were just cause for the continued lamentations that we have been hearing for years about the best brains leaving the farms, then the dullest intellects would now be found in the rural districts and each generation would become duller than the preceding one, just as the farmer who would select his poorest grain for seed would soon find it running out, or on the same principle that a farmer who would select his scrub stock for breeding purposes would soon find that he had none other than scrub stock left.

The question might be asked, why do farmers' sons not go west and settle on the unoccupied lands of the government, instead of deserting the calling to which they were brought up, and flock to cities and towns to engage in other pursuits? The answer is that many of them do and that the western states have been filled up with young men from the other portions of the country. One reason why many young men go to the cities and towns is that on reaching manhood they lack the necessary capital to start for themselves on a farm, and are compelled to seek employment that will enable them to meet immediate wants, and such employment is more readily procured in the cities than in the country. Another fact must be borne in mind, namely: that all boys are not cut out for farmers. Most boys are born with an inclination for some particular pursuit or calling. While some take naturally to farming, others find that their natural inclinations are to be mechanics, traders or professional men and in this day of sharp competition in every department of life every young man should follow the bent of his inclination. Thousands of young men have left the farm in the years that are past on account of their disinclination to farm life, and thousands will leave it in the years to come and try their fortunes in other fields. Many of them will no doubt make life more of a success than if they had stayed on the farm, but it will be at the cost of hard work and a close application to business. The farmer's son who has a taste for farm life will make a success on the farm by the same means, and he is the boy to remain and follow the pursuit of his ancestors.

We think that much of the regret of boys leaving the farm is uncalled for; that there is no reason to worry about them. If a boy is well bred and has been thoroughly drilled in those old-fashioned farm virtues—industry, honesty and economy—there is no fear of the result. Such a boy can always find a place in the city, and the kind of a boy that will succeed can be picked out with unfailing accuracy before they leave the farm. The boy who is sober and honest under all circumstances is the boy that is wanted. The boy who is dishonest or who has formed the habit of running to saloons and drinking whisky is not the boy that is wanted. The boy who has contracted the habit of frequenting gambling resorts where cards and liquor are the principal allurements had better remain in the country, the city has no use for him as he soon will become the slave of his own appetite and evil passions when brought into contact with others who are always slaves to their immoral desires.

The right kind of a boy will make a success anywhere. It is merely a

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matter of inclination or circumstances whether he should remain on the farm or choose to go to the city. If a boy's tastes incline him to the farm, educate him for it and let him stay there. If for a trade or profession, educate him accordingly.

Ordinarily the man who succeeds in the city would have succeeded on the farm had his inclination been in that direction, and the man who fails in the city would in all probability have failed as a farmer. It is character with a proper training that is the main element of success in life.

There is much complaint among farmers because of the inclination of their boys to leave the farm and seek employment in the cities. I have known fathers who were greatly troubled in consequence. It may not have occurred to them that their boys may have had a reason for so leaving. There may have been a natural unfitness for the life on a farm, or perhaps a superior fitness for some other calling, or perhaps the management has been such as to alienate the boy from that particular farm. They perhaps have been invested like so much capital on which the father is receiving so much interest per annum, and as a consequence are worked to the limit of endurance to satisfy a morbid desire for gain.

The usual expectation is that when the pecuniary ends of the farmer are accomplished, or the boys have grown out of his hands, they will accept a portion of the hoarded gains and settle down to plod through the same routine with the next generation. Much seeming wisdom and parental affection are thus manifested, but the wisdom too often proves unwise and the affection only a mistaken form of well-developed selfishness. The possibility is that out of such a family of four or five one may fulfill the desire of the father, accept the homestead and settle down and lead the same plodding life of drudgery, but the greater probability is, that as soon as legally free from parental control, nature will assert her claims in each, and they will go out into the world seeking for the life that should have been theirs through years of preparation for it; but having been cheated out of that preparation it need not be any wonder if they come forth ill-developed, unsuccessful men, seeking their places and finding them not. In the past farming has been considered a business that any ignoramus might engage in successfully. It was not thought necessary to lighten or brighten the labors of the farm by any rays of science or gleams of intelligence from the world of thought. Work was the one thing wanted from sunrise till bed time, and the physical nature continually over-wrought had neither strength or sympathy to give to the mental, which as a natural consequence grew dwarfed and distorted in the unnatural surroundings. Struggle against it as they might with bits of candle and lighted firebrands in the chimney corner, overwearied nature was more than a match for fancy, philosophy and metaphysics, and where one boy with such culture has come forth a perfect man, mentally, morally and physically, nine hundred and ninety-nine have been unhappy failures.

Is it any wonder that the boys leave the farm under such circumstances, or is it any wonder that the father has been left alone on the farm in his old age, where the above was the order of the work upon the farm? What reasonable man would expect a bright, intelligent boy to stay on the farm under such circumstances? There is no reason or excuse for making the farmer's boy a beast of burden, nor is there any excuse why he should be

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compelled to live the life of a miser and have his mind dwarfed by circumstances over which his parents could and should have control.

The great majority of farmers who are now fast coming upon the field of action have learned that they must progress with the times, and that science and intelligence must go hand in hand in all their work in field and barnyard, where their boys do their work, and that the days of drudgery for the sake of gain must be a thing of the past. They have learned that employment must be given to the brain as well as to the hands if they wish their boys to lead a contented life upon the farm. Changes, innovations and improvements are going on in every department of farm life, and the farmer that fails to realize it is not up with the times. There is an improvement all along down the line. The farmer of to-day is not the farmer of forty years ago. There has been a great improvement, and there is a strife among them to see who can get the furthest along in the line of progress. Methods and fashions are changing, and the old fashioned farmer will soon be left stranded upon the shores of time, and the farmer who does not care to be thus stranded must do his own thinking as well as his own labor.

Farm life is the most natural to man, and it should be the most delightful, and at the same time it should be remunerative without being slavish. Mere grinding toil of itself is no credit. Treat the boys as though they were of some importance. It will make them manly and self-reliant.

Furnish your boys with good, wholesome reading matter. Discuss with them what they read and draw out their opinion of any subject. This will help them to think for themselves. Make home pleasant for the boys, so that they need not go somewhere else to find congenial companionship. Let them bring their boy friends, yes, and their girl friends, too, home with them, in the confidence that they will be welcomed, and that cheerful amusements in the way of music and books have been provided for their enjoyment, and they will not be slow to appreciate it.

The following taken from the Monthly Bulletin of the State Board of Health for May, 1892, is from the pen of Dr. Kennedy, and is the best description of a country boy I have ever seen, and is well worthy of a place in this paper:

THE COUNTRY BOY.

"We have in the thirty-five years of life in Iowa spent much of it in the homes of the farmers and have seen that boy—the country lad as he is. He rises early, he is acquainted and interested in all the stock and poultry, he knows all the country roads, he is acquainted with every bug and worm, bird and animal, tree and flower, weed and cereal on the farm. He has a good appetite and digestion and his sleep is sweet and refreshing. He reads thoughtfully the great book of nature, whose leaves open before him day by day. He loves his father and mother and calls them such, and he loves his sweetheart as no town boy does, and is loved in turn by her as no town boy is. He works hard all day, and when night comes he enjoys a frolic with a healthful zest and then lies down to peaceful dreams. He grows to man's estate with the rich heritage of good health, a clean, pure character, industrious habits, a mind well stored with practical knowledge gained at the fireside and in the country lyceum, affectionate and trusting in his disposition, polite and courteous, though somewhat awkward in his manners, and in

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every way equipped for the battle of life He knows nothing of the vices and follies, the mockery and hollowness so often seen in city life. He is a grown up man and the chief places in business, in the city and nation, come into his possession. He has the stuff in him that qualifies him under proper guidance for eminent statesmanship, for military renown, for professional success, for judicial distinction, and for the grandest citizenship. The grandest men of our nation have been, and the grandest in the future will be, found among the country boys of our land. He may, at times, think his country home plain and unattractive. His life one of drudgery and hum drum, and may at times envy the town boy his more exciting life and opportunities, but let him not worry. He has a far richer heritage, and the future will be a satisfactory revelation to him. God bless the country boy! He is the hope of the nation."

EVERGREEN HEDGES.

BY EDWARD HOYT, SCOTCH GROVE.

Nothing, in our opinion, is so peculiarly attractive in a well kept place as an evergreen hedge neatly trimmed; and nothing really injures the appearance of a place more than one that is neglected and allowed to grow at will. Either as an ornamental boundary or for a protective screen, no class of plants can equal those with persistent or evergreen leaves. Always green and cheerful through the whole year, an impassable barrier to winds and storms, easily clipped, of rapid and dense growth, and comparatively free from disease, they comprise nearly all the requisites needed for a hedge. True, they cannot be formed into a defensive barrier against the invasions of unruly cattle, or the depredations of the fruit stealer; but in beautifying our homes and endeavoring to create additional attractions in their surroundings, we desire something more than the merely practical; there can be no place, however small, but what may receive an added charm by the introduction of a neat evergreen hedge. Such improvements are invariably associated with good taste and refinement.

Evergreen hedges may very properly be divided into two distinct classes, which, in the planting, selection of varieties, and after management, differ very essentially from each other. First, those intended strictly for shelter, or to conceal unsightly objects; and second, the true ornamental hedge.

The former requires less care, an occasional clipping of the stronger branches, and a heading-in of the taller plants. We need in a screen or barrier to break the force of storms a strong growing, hardy species that is not easily affected by the wind. We find this in the White Pine, Scotch Pine, Norway Spruce and White Spruce. The Red Cedar and Arbor Vitæ afford an excellent screen in a small place; but for a roomy place we prefer the pines and spruces. For shelter, we find it is best to plant in rows in the

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form of hedges, placing, when we have the room, the rows twenty-five to thirty-five feet apart, so the branches will not grow together between the rows. *Three or four rows planted in this way will give more protection than the same number of trees planted in any other form.* The true ornamental hedge, to please the eye, by its symmetrical proportions and richness of color, should receive a full amount of care and attention, because the neglect of one season will very frequently cause it to become disfigured to such a degree as to require several years to rectify the damage caused by the neglect.

After determining the location of the hedge, the ground should be plowed or dug deeply, about four feet or more in width, and the plants set along the center of the pulverized strip (we prefer to plant about 15 or 16 inches apart, for Arbor Vitæ); trim off the tops of the larger plants and the side shoots that project out further than the main portion of the hedge. The ground must be kept clear of weeds. Bear in mind that the evergreen hedge should be treated as a completed hedge from the first. It should be the aim to produce an impenetrable mass of foliage, especially at the base of the hedge. The requisite shape should also be given as soon as circumstances will permit.

We prefer the pyramidal shape, wide at the base and tapering to the top. The trimming should be so as to preserve this shape; no perpendicular walls, no flat tops in the evergreen hedge should ever be allowed; the two sides should meet in a middle line, or at most a very little rounded at top, and at most but three or four inches in width.

The cutting or clipping may be done with the garden shears, by which all protruding spray is removed to the proper surface of the hedge, which should be kept as even and regular as possible. While pruning the hedge care must be taken to preserve the upper line regular and even, as this will contribute to the beauty of the whole affair, and any deviation from it will detract from the appearance of finish and completeness which should characterize the evergreen hedge. It is very easy to produce a tall hedge, but to form one with a close, broad bottom requires a proper amount of attention, for after the hedge is grown this cannot be accomplished. In after years, when the hedge arrives at its required height, all that will be necessary is an annual use of the shears, and due attention to keep the weeds and other strong growing plants clear from the row. The time to transplant is when the tree is in its most dormant condition. But in cold climates this period is so extended that if the trees are transplanted at the beginning of it they become weakened and often entirely deprived of their natural juices by the evaporation through their leaves and twigs before a fresh supply can be obtained by the action of their roots upon the soil in which they are planted. The mere contact of roots with moist soil is not sufficient to enable them to absorb nutriment to any considerable extent, but contact through growth is necessary to bring their absorbing functions into action. *It is for this reason that* transplanting evergreens in cold climates should be done in the spring. In this climate there are frequent showers during the spring months, and with the increasing heat of the sun, and with an atmosphere laden with moisture, all trees awake from their long rest in a condition to recuperate after having been disturbed or checked in its progress. So *it is the safest and best season in which to transplant trees of all kinds.*

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QUESTIONS FROM THE QUESTION BOX.

4. Is this society in favor of offering premiums to encourage horse-racing at county fairs?

MR. BRANSON: We can't regulate or prevent horse-racing, and we had better not try.

MR. PORTERFIELD: Our fairs would prove failures without the horse-racing.

MR. DAVIS: There is no more necessity of gambling on horses or betting on an election than offering a premium on best plate of apples.

5. Can quinces be raised in Story county?

MR. BRANSON: I think not very successfully. We can buy them cheaper than we can raise them.

6. Has anyone grown a good crop of Juneberries?

PROF. HANSEN: If only a few bushes are planted the birds take the berries as soon as they show color. By using bird netting, which costs but little, and will last twenty years, if put away when not in use, we can get a crop. In large plantations the share of the birds will not be missed.

The Committee on Resolutions reported as follows, which were adopted:

WHEREAS, We are nearing the close of our sessions, and feel that we owe a debt of gratitude to those who have made our meetings so pleasant and profitable; therefore

Be it resolved, That we tender our thanks to the good people of Ames for their generous hospitality.

Resolved, That we extend our thanks to mine host, Mr. Davis, for the generous manner with which he has administered to our bodily wants.

Resolved, That we owe a debt of gratitude to the professors of the Agricultural College for their untiring efforts to make our meeting one of the most profitable and pleasant memories of our lives.

Resolved, That our hearts go out in sympathy for those true and tried members who have been kept from this meeting on account of sickness and the infirmities of age, the influence of whose genial natures and words of wisdom have been sadly missed.

Resolved, That we tender our sincere thanks to the retiring officers of our organization for the able manner in which they have administered the affairs of the society during their term of office.

QUESTION BOX.

7. Why are not more of our discussions printed in our reports?

SECRETARY BURTON: I have always sent to the secretary of the State society all of the discussions which I thought worth preserving. But I learn that for want of room, some of our discussions are omitted, some of our papers cut down and some of them left out altogether. Among the latter was a paper from Secretary Budd. I

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do not wish to find fault, but the fact is we have not had near as much space given to our society in the last three years as was given either of the other societies. The limit fixed by law is 500 pages.

SOCIETY.	Year 1890—pages.	Year 1891—pages.	Year 1892—pages.
Northeastern Society	90	113	91
Southwestern Society	80	89	90
Southeastern Society	56	71	63

Perhaps the reason for this discrimination is that our papers are not up to the required standard.

REVISION OF FRUIT LIST.

APPLES.—*Summer:* Whitney, Oldenburg, Benoni, Astrachan, Cole's Quince.

Fall: Wealthy, Fameuse, Longfield, Utter's Red, Dyer.

Winter: Willow Twig, Grimes Golden, Roman Stem, Black Annette, Jonathan, Ben Davis, Paradise Sweet.

PLUMS.—De Soto, Forest Garden, Maquoketa, Wolf, Hawkeye, Wyant and Wild Goose.

CHERRIES.—Early Richmond, Wragg, Montmorency, English Morello.

STRAWBERRIES.—Beder Wood, Parker Earle, Bubach, Captain Jack, Crescent, Windsor Chief.

RASPBERRIES.—Gregg, Turner, Cuthbert, Tyler, Shaffer, Older.

GRAPES.—Worden, Moore's Early, Concord, Pocklington, Agawam, Lady, Cottage, Brighton, Niagara.

PEACH.—Bailey's Seedling.

PEAR.—Kieffer.

CURRANTS.—White Grape, Victoria, Fay.

REPORT OF COMMITTEE ON AWARDS.

Best collections of fruit grown by exhibitor, A. Branson	$ 5.00
Best plate of seedling apples, A. Branson	3.00
Best plate of Barber's Sweet, A. Branson	.25
Best collection of canned fruit, Mrs. L. H. Pammel	5.00
Best jar of black raspberries, Mrs. S. A. Davis	.50
Best jar of red raspberries, Mrs. S. A. Davis	.50
Best jar of blackberries, Mrs. S. A. Davis	.50
Best jar of plums, Mrs. S. A. Davis	.50
Best collection of potatoes, A. J. Graves	2.00

Your committee recommend that the exhibit of Chrysanthemums by Mr. Green receive a special premium of $5.00, and a vote of thanks for his beautiful display of cut flowers.

MRS. S. K. WILSON,
JONAS MILLER,
D. F. BRUNER,
Committee.

Moved and carried that we place on file the request of Mr. Hoopes that this society meet at Muscatine after it has fulfilled pledges to other places.

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TRANSACTIONS

OF THE

NORTHEASTERN IOWA

HORTICULTURAL SOCIETY

For 1893.

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OFFICERS AND DIRECTORS FOR 1894.

PRESIDENT.

W. A. BURNAP, - - - - - - - - - *Mason City.*

VICE-PRESIDENT.

J. M. ELDER, - - - - - - - - - - - *Concord.*

SECRETARY.

ELMER REEVES, - - - - - - - - - - *Waverly.*

TREASURER.

EDSON GAYLORD, - - - - - - - - - *Nora Springs.*

DIRECTORS.

First District—J. B. MITCHELL, - - - - - - - *Cresco.*
Second District—C. F. GARDNER, - - - - - - - *Osage.*
Third District—S. W. FERRIS, - - - - - - - *Bristow.*
Fourth District—C. H. TRUE, - - - - - - - *Edgewood*

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LIST OF MEMBERS.

LIFE MEMBERS.

Mott, D. W.....Hampton
Patten, C. G.....Charles City
Reeves, Elmer.....Waverly
Secor, Eugene.....Forest City
Sherman, E. M.....Charles City

HONORARY FOR 1894.

Kinney, P. F.....Storm Lake
Porterfield, D. A.....Traer
Watrous, C. L.....Des Moines
Wedge, Clarence.....Albert Lea, Minn

ANNUAL MEMBERS FOR 1894.

Ash, H. W.....West Union
Burnap, W. A.....Mason City
Connor, E.....Humboldt
Doolittle, H. G.....Sibley
Elder, J. M.....Concord
Ferris, J. C.....Hampton
Ferris, B. F.....Hampton
Ferris, S. W.....Bristow
Forbes, E. F.....Nora Springs
Gaylord, Edson.....Nora Springs
Griffith, C. H.....Eagle Grove
Gardner, C. F.....Osage
Gardner, C. E.....Osage
Gamble, T. H.....Addison
Ivins, G. A.....Iowa Falls
Mitchell, J. B.....Cresco
McGregor, D.....Mason City
Nickerson, M. H.....Nora Springs
Orr, Ellison.....Postville
Purdy, D. J.....Mason City
Ray, W. L.....Mason City
Reeves, N. A.....Waverly
Smith, Cyrus E.....Fairbank
Smith, J. W.....Charles City
Schmidt, C.....Cedar Falls
Trescott, C. P.....Plainfield
Watrous, C. L.....Des Moines
Brown, Eugene.....Mason City
Frankland, Thos.....Stonewall, Manitoba

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PROCEEDINGS

OF THE

NINTH ANNUAL MEETING

OF THE

Northeastern Iowa Horticultural Society,

HELD AT CHARLES CITY, DECEMBER 19, 20 AND 21, 1893.

TUESDAY MORNING.

The ninth annual session of the Northeastern Iowa Horticultural Society was opened Tuesday morning at Charles City. As but few were present, no regular program was carried out, but an adjournment was taken until afternoon.

TUESDAY AFTERNOON.

Called to order by President Ash.

In place of Director's report the program was arranged for all present to report on the fruit crop of 1893, and these reports were called for. The following is a partial record of the report:

J. C. FERRIS: I have not much to report in the way of a fruit crop. Apples generally, a failure, although some varieties bore a

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small crop. Strawberries a fair crop, also raspberries. Grapes excellent, and plums a small crop.

J. B. MITCHELL: Apples were nearly a failure with us. Strawberries one-third of a crop. Raspberries nearly a full crop. Apples did not generally bloom much, but some trees bore a good crop. One man reported sixteen bushels on one tree and not that many on all the rest of the orchard. I should have had at least one hundred and fifty bushels, but did not have five. The grape crop was good.

N. A. REEVES: My orchard blossomed well, but only one tree bore well and that was a Wealthy. Apples set well on many trees but kept dropping off, caused, I suppose, by cloudy, wet weather. Strawberries were small and poor; raspberries not a full crop; currant crop small. Blackberries were very good, but as I did not have them as well mulched as they should have been, they dried some and were not of the best quality. Grapevines were loaded, but the fruit was not as juicy as usual and quality not up to that of a year ago. Juneberries were loaded as they always are. They are the surest of any fruit and very easily grown. Birds did not take the Juneberries as they usually do, and we had all we wanted and the neighbors picked a great many. The fruit is similar to the huckleberry. They always bear, and when in blossom are a grand sight. I raise the Oporto grape and they are no trouble to raise, as they are perfectly hardy and will run on trees and take care of themselves. The fruit is about the size of Janesville and much richer in quality. Our vines were set out about twenty years ago and for the past ten years they have not been trimmed, but we have gathered loads of fruit. It is better after a good frost and makes excellent sauce when mixed with Juneberries. Plums were not a satisfactory crop and cherries were a failure. My Juneberries are the dwarf, but they grow ten feet high.

E. GAYLORD: Juneberry is the shadberry of the east. The birds did not eat them this year as they usually do. I planted them to shade apple trees. The huckleberry of the east grows from one to three feet high, and the fruit is about the size of Fay's currant.

H. W. ASH: Huckleberry is botanically different from Juneberry and does not thrive here.

M. H. NICHOLSON: Apples were a poor crop; we had a few Wealthy and Oldenburg. The cause of the failure is commonly supposed to be because they bore heavily last year. Strawberries, a small crop generally. Currants and gooseberries bore but little. Raspberries and blackberries gave but little fruit. Mr. Heisz had a few Melinda apples, and I heard of a few others; and there were some in the market, but the crop was generally small. Blossoms were not very abundant, so there could be but little fruit Most of those who had apples kept the trees well manured.

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N. A. REEVES: Over-bearing had nothing to do with the failure of the crop with us, and we have trees of Oldenburg that bear on alternate years, and they all failed this year. I manure the trees, so if a fruit year comes I get a good crop.

C. L. WATROUS: We had two good pickings of strawberries, and then they ran small and poor. Of raspberries and blackberries there were almost none. Grapes of every variety bore well, even Rogers' hybrids; Pocklington and other shy bearers were full. Of cherries, there were none. Native plums bore well and sold readily at from one to ten dollars per bushel. Pears and peaches are not successfully grown at Des Moines. Apples were a light crop, and of only a few varieties. Cole's Quince, which always bears, had some fruit; also Lowell, Ben Davis and Willow Twig, and we had a few Grimes Golden. Sheriff bore so I had some to put away for winter. It always does well with us, but is not widely known. Iowa Blush generally has apples; it is small, but a good apple; the crop was shorter this year than last, and we thought that a failure, and apples now sell on the market at $5.25 per barrel; Iowa Blush is fairly hardy, but not so hardy as Sheriff or American Beauty, as it is sometimes called, but both are hardy at Des Moines, and usually bear.

H. BARNES: They tell great stories over in Wisconsin about what they raise, but we have had very little fruit, although I have raised some. I had a man put coarse manure on some strawberries, and I thought he had spoiled them, but where the spoiling was done were the best berries, and after this I shall use coarse manure as a mulch.

C. L. WATROUS: Thayer, of Wisconsin, cultivates well early in the season, and then mulches a space two feet wide in the rows of raspberries and blackberries, using green clover, but I suppose coarse manure will do as well. The spaces between the rows are kept well cultivated, and after the fruit is picked the old canes are removed. He buries all kinds of small fruit in winter, laying the bushes to the north, so the new canes will grow to the south and shade the berries.

H. W. ASH: Clover is especially valuable as a mulch, as it reduces the temperature of the soil it covers, and decays so that in the spring the cultivator can be used, which cannot be done if straw is used. Clover brings the moisture closer to the surface than any other mulch.

C. G. PATTEN: Buckwheat would decay as readily as clover and, if sown broadcast, is one of the best soil covers, and two crops can be grown in one season, while clover cannot always be grown. If one acre is planted to small fruit, and the labor usually put on two acres is put on this one, the crop will be more and the profit larger.

B. F. FERRIS: Of Oldenburg we had a few good specimens.

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Wealthy were of good quality and a small crop. Kaump not so good and quality not up to Wealthy. In some orchards the Haas bore, but this was not general. There were no crab apples. Wolf plum did well. Moore's Arctic appeared to be killed in spring but came out and bore well. There were no cherries. Our trees were infested with the cherry slug, a soft snail-like thing one-fourth of an inch long. I applied poison the same as on the potato and killed them. Strawberries gave us two good pickings. Blackberries killed almost entirely, but if ground is rich and well cultivated the Snyder never fails to give good fruit. I believe this is also true of raspberries. Mulching is a good plan, but is a great task and but few will do it. Cultivation will do in place of mulching. We can almost dispense with manure if we cultivate enough. Many cultivate up to picking time and then stop. I tied up the canes and continued to cultivate while berries were ripening. Twice each week is not too often. Varieties of apples that had the leaves hurt by the wet spring of 1892, had no fruit, but those that stood the test of 1892 bore this year. Those injured did not blossom.

C. G. PATTEN: A year ago we had an excessive rainfall with cloudy weather for a long time in spring. Leaves of many varieties were so injured by that excessive moisture and affected with rust, etc., that the trees were nearly defoliated, and of course could not develop buds and bear a crop of fruit this year. Toward the west we had more sunshine and less rain, and last year they had a crop in the west part of this State and shipped a great many apples. But many sorts such as Haas, Transcendent, and crabs generally were injured by the rain and cloudy weather of the spring. Then we had a dry spell in the fall, also a warm spell in March following, which taken altogether, left the trees in such a debilitated condition that the fruit we had was poor, and it kept dropping all summer. It was a combination of circumstances that we have never had before that caused the failure.

C. P. TRESCOTT: I think Mr. Patten is right in a measure, but I attribute the failure to cold and rain in the spring when the trees were in bloom and the blossoms were not fertilized. I raise some berries and have no clover to mulch with, but I have horses and believe not only in cultivating thoroughly but intensely. I have what is called the "Common Sense" cultivator which is simply iron pegs in a frame, and I can cultivate every day through the summer and not ridge up my rows. Last summer we had no rain from July 5th to the last of September, but I cultivated twice each week right along and carried my patch through all right and have good rows of plants. I am on the divide between the Cedar and Shell Rock rivers and have a heavy black prairie soil. I cultivate raspberries with a fine

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toothed cultivator. Had two acres of strawberries and picked seven thousand quarts. I cover in November with any material I can get. Never had plants smother by covering and have covered five inches deep. I leave one-half the covering on the plants in spring. Early in November is as good as later for covering, and deep covering has given me best results. Had Warfield with Wilson as fertilizer this year. Should advise farmers to set Crescent as it will do on all locations, but it is softer than Warfield. Warfield is best for market and it ripens and picks well with Wilson, as both are of a dark red when ripe. Pickers are apt to pick the Warfield when it is colored on top, but has a light spot on the under side, but they should be left until they are dark colored, unless for a distant market. Set rows three feet eight inches apart and Warfield three feet apart in the row. Crescent two and one-half. Plants often get too thick and will not bear well and fruit is small. This year I set every fourth plant a Wilson and broke joints in different rows. This plan takes less staminate plants and is sure to fertilize the bed well. I believe Warfield will hold its size as well as Crescent, and it is a sweeter berry when fully ripe. Warfield is easy to hull, while Crescent is hard. For market this is a fault, while for home use it is an advantage. I shall try Beder Wood as a fertilizer next year. Would not give one cent for Jessie and Bubach on my grounds.

C. L. WATROUS: At Des Moines the Bubach is one of the best berries we have.

W. A. BURNAP: Bubach is one of our best for home use and near market, but it is soft. We made a good showing of apples at our fair but had to use about all the apples we grew. Plums were a failure, except some Miners, grapes a full crop, raspberries a partial crop, blackberries a failure and strawberries a partial crop, so with the exception of grapes, the crop of fruit was nearly a failure.

S. W. FERRIS: My success with apples was better than usually reported. Last year I sold 350 bushels of Oldenburg and they netted me one dollar per bushel at home. This year I sold about 100 bushels and four-bushel barrels sold at $5.00. Oldenburg should be picked before fully matured to carry well to market. Briar's Sweet and Haas did not make a good growth last year as they had no good leaves and had no apples this year. The trees that stood exposed bore while those protected did not bear, so I suppose the wind kept the frost from settling on the exposed trees. The man on a high ridge and prairie soil has an advantage over the one on a river bottom, where the soil is apt to be sand or sand and gravel subsoil. Soil on the prairie is usually clay subsoil. Ben Davis, Willow Twig and Roman Stem are bearing in my locality on the open prairie. Have

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had lots of failures but have had crops that in one year paid me all the orchard cost. Plumb's Cider is doing well on Virginia and is a good apple and keeps well if picked early. Wealthy on Transcendent, nineteen years old and grafted three feet high, is the first I set of the Wealthy and is still doing well. Wealthy sun-scalds easily on the trunk, and it is an advantage to set an evergreen by each tree or protect it in some way. I can make more money on Oldenburg and Wealthy in orchard than any other way. Oldenburg apples can be grown at a profit of twenty cents per bushel.

C. P. TRESCOTT: I believe they could be grown for ten cents.

S. W. FERRIS: I used to think that apples should be stored as dry as possible to keep well, but now I keep them as wet as possible.

Credentials of D. A. Porterfield, delegate from the Southeastern society, were read, also those of P. F. Kinne, delegate from the Northwestern society, and both gentlemen were made honorary members of the society.

TUESDAY EVENING.

Session called to order by the president.

TREES AND FRUITS FOR THE FARM.

BY B. F. FERRIS, HAMPTON.

Hard Maple, White Elm, Hackberry, Black Cherry, Box Elder, Ash, Soft Maple, Cottonwood, Catalpa and Larch for shade trees.

Apple, plum, cherry, pear, prune, peach, apricot and mulberry, are the possibilities for fruit purposes.

Pines, spruces, firs, cedars, etc., for wind-breaks, hedges and ornamental purposes.

It would require a lengthy article to describe any one of the above list, but as I do not wish to weary you, I will pass all but those I think most valuable

For shade or street rows, I would not mix varieties. One side of a street or driveway, say maple, and the other elm; or one side deciduous and the other evergreen; or, one side fir and the other pine or spruce. This rule

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should be observed more strictly, perhaps, with deciduous than with evergreen trees, some preferring to blend the different shades of green, but I think rows of different shades make sufficient contrast.

Nothing looks better for a front yard than a well-kept lawn, but if you have had forethought enough to plant your shelter belt twenty rods from the house in place of one or two rods, conifers may consistently be planted in groups or pairs. Of course it is understood that there are as many shades as there are different species, Norway and White spruce being the lightest and Red cedar the darkest. The latter is of no comparative value, except when sheared. The Blue or Silver spruce of Colorado has the most attractive color, and no collection is complete without it.

Fruit trees are not out of place in the front yard, if they can be got to bearing age in good healthy condition. This can be done if we get varieties adapted to our climate, and cultivate or continually mulch. Cherry trees are less liable to be robbed by birds or boys if they are near the house. A good Oldenburg or Whitney No. 20 is sightly and will bear good fruit in abundance. The same is true of other apple and crab apple trees.

The Wild Black cherry is a clean, rapid growing, fruit-producing tree, and is of infinitely more value to most planters than the new, high-priced cherry trees they are induced to buy. Cultivation agrees with them, making them grow more rapidly, and increasing the size of the fruit.

The Catalpa must not be forgotten. It is condemned by many before they give it a fair trial. The oldest trees on my place are ten years old, and they appear to be as much at home as any trees I have. The young ones are often killed to the ground, but by cutting all but one sprout, that is sure to come with spring. They are almost sure to make good trees.

If there is any one here not acquainted with the Larch, I would say don't be afraid to plant it, for it is both useful and ornamental; starting very early it must be planted early. If, however, from any cause the planting must be delayed, they can be kept in a cool, dark place almost indefinitely, and still grow. Of course the roots must be kept moist and the tops comparatively dry. This rule holds good with small conifers and other tree plants.

Suppose you plant a Whitney No. 20, or other hardy apple tree in front of your house and graft in each branch some choice apple, leaving the center stem or leader to bear Whitney apples.

Almost everything seems to unite well with Whitney. The contrast of blossom, and later, when the tree is burdened with eight or ten kinds of apples, it is a thing of beauty and of profit.

Passing from ornamentals to fruit, I will continue with the apple. Our most hardy, thrifty kinds can be planted on every farm in Iowa and made successful. I believe no one who reads or thinks, doubts it. Some think they can't afford to have an orchard because they don't get as quick returns as they like. I would suggest varieties, but as we differ as to relative value, I will only say that there are so many, that all of us agree upon this—that no one need be at a loss for the foundation for an orchard.

The value of cold storage is getting to be so well understood, it is now admitted that we can have Oldenburg apples all the year, and, like wine, they improve with age.

Plums can be relied upon if we spray. Cherries seem to be more easily affected by the weather, but by selecting kinds adapted, and using the spray

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pump, we can eat cherries; and the good wife can make pies nearly every year from the fruit of our own trees.

So many grapes were grown in Iowa and Minnesota last year that they were sent to Chicago, where they met the New York stock and competed successfully, I am told.

Currants, raspberries and blackberries have been proved to be at home in northeast Iowa, both for home and for market.

If statistics could be had, fruit growers as well as all other classes would be surprised at the acreage of small fruits planted in this part of the State in 1893. The surprise would be still greater if we could know the amount to be planted in 1894; not only small fruits, but apple orchards. Will we overstock the market? Not soon.

We are in the center of the best market of the world. Of course, when the benefits of spraying are better understood, and more generally practiced, the supply will be immense and more regular than at present, but with the increased acreage, and the knowledge of spraying, will come a better knowledge and a more general use of cold storage and increased facilities for putting the fruits in reach of consumers.

DISCUSSION.

C. F. GARDNER: I did not hear Mr. Ferris mention the black walnut.

B. F. FERRIS: It is not much planted by farmers as they have an idea that they are hard to transplant and they can be grown from nuts much easier. Hickory is also difficult to transplant and is a slow grower.

J. C. FERRIS: Agents report that farmers say that the black walnut is a slow grower. I have trees that keep pace with ordinary deciduous trees. They are easy to transplant at one and two years of age, and will fruit at eight years of age. Black cherry should be more used as a street tree. It grows rapidly and fruits early. Fruit trees should be planted as street trees. I have a row of Whitney on the street and they make a fine show twice each year. First when they are in blossom and again when the fruit is ripe. If the boys do take a part of the fruit they will still be profitable.

C. F. GARDNER: Black walnuts are apt to appear sickly after they are transplanted. I sawed off some that were and they grew six feet the first year and I would recommend this.

QUESTION: What time did you cut them off?

ANSWER: In the fall.

E. GAYLORD: Black walnut is a persistent sprouter when cut off. I have some that I have cut off every year for thirty years and they sprout yet.

J. B. MITCHELL: Is it not a good plan to let the trees grow a year or two before cutting the top off? They would be apt to die if cut when set.

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W. A. BURNAP: Twelve years ago I set some larch trees and now estimate them to be worth $300 per acre.

J. W. SMITH: I have a red cedar in my yard that is a fine tree. It is free from disease and insects but is a slow grower. If street trees are planted too closely they keep the roads damp. Seventy feet is close enough.

B. F. FERRIS: Red cedar is of no *relative* value. If we had no better species it would do, but we have those of faster growth and much better color.

J. W. SMITH: Red cedar is valuable for posts, as they will last a life-time. I feel like opening the batteries against planting trees so they will touch the house. This is a common mistake; it shuts out the sun, and the sun is the best destroyer of disease germs.

E. M. SHERMAN: Red cedar is subject to searing of leaves, and will often die off on one side. My father planted a hedge of them in an exposed place, and they gradually died out and the hedge was finally destroyed.

C. F. GARDNER: I have a hedge of them that is perfectly healthy. In all places where there is an obstacle close to the red cedar they die out; but they want to be a rod away from any object. My hedge is a single row and fully exposed to the wind.

S. W. FERRIS: In the court house yard at Allison are some cedars, set nine years ago, and sheared egg-shaped, and they atttract a great deal of attention and are generally admired.

C. G. PATTEN: Because a tree is of slow growth is no reason why it should not be grown. The hard maple is of slow growth; we have at least three varieties, and they should all be grown. Catalpa is decidedly beautiful when in bloom, and by planting the different sorts, will give a succession of bloom for at least three weeks. It is the most tropical appearing tree we can grow, and if selected properly is perfectly hardy; and by selection, we can advance the limit of its growth at least fifty miles to the north. Red cedar is entirely different in the north from what it is in the south. Those from the south are not hardy here; those native to the north of Iowa and along the Missouri river are hardy and will develop into nice specimens. Trees from the Platte river were supposed to be hardy, but I have tried them, and they are not equal to the cedar of this vicinity.

N. A. REEVES: I have a great many trees of many kinds, but I have no finer tree than the white birch. The finest one I have is a weeping cut-leaved birch, and it is grand. The black birch is a nice tree, and an old acquaintance of mine; the bark tastes like winter-green. Farms should be planted with a variety of trees. Each fills a place of its own, and I want all the kinds I can get. We have a

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beautiful country, but we want all kinds of trees to diversify its beauty. Hemlock is a graceful and beautiful tree.

H. W. ASH: When I see trees headed back or pruned to fanciful forms, I believe it to be unsightly, and not in good taste. Catalpa is the nearest like tropical foliage we can have, and by cutting it off each year it will grow several stems, and sometimes ten or twelve feet high, and is very ornamental.

SEEDLINGS.

BY W. A. BURNAP, MASON CITY.

Doubtless my friend Patten and others who have spent a lifetime studying this subject have wondered at my audacity in entering their domain uninvited and without experience.

In life, however, circumstances and not years constitute experience and often one person may be so situated as to learn more in a month than another in a lifetime, therefore, it is not beyond the bounds of possibility that I may have learned more of seedlings in the last four months than my seedling friends "ever dreamed of in their philosophies."

A year ago when I exhibited Patten's magnificent Greening and grand Iowa Beauty, fruited upon my own trees, I felt greatly encouraged at the seedling outlook and believed he had done a grand thing for horticulture in this district, but all that is as the glimmer of a penny-dip candle to the sun in his splendor, compared with the glorious things we have had *demonstrated* (?) in our county the past summer. With boundless pleasure I come to proclaim that the Utopia of horticulture is just nearing our borders; that the Garden of Eden, lost so long ago, is now just to be replanted in Cerro Gordo county by *seedlings*. Father Adam even was not so gloriously fixed as we, for in his time he was compelled to till his garden, but we are to have our orchards cared for by angels in disguise—very much disguised, who will come from year to year to till ours for us. A year ago I thought it a splendid thing to have two or three seedling apples of fair quality of season of Wealthy and of promising hardiness introduced, but that now all sinks into utter insignificance compared with the ample numbers of all varieties, apples, peaches, pears and plums, all of first quality covering all seasons of the year *absolutely hardy* because they are seedlings, and *seedlings are always hardy*, all such vigorous and abundant bearers and of such prepotent potentiality (I guess that's it), that all we are required to do will be to set a few, just a few, of each of these trees and in two years they will bear; then plant the seeds of their fruit and they will reproduce themselves true to variety and in a short time we will have orchards of these

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wonderful apples, peaches and plums, and acres of vineyards, and the millenium will follow right along. And now what should I do as a dutiful member of your society but come to you and bring these "glad tidings of great joy" and invite you to come up and get just a few *seeds*.

Of course there must be some *few* drawbacks to this vision of beauty, the beneficient beings who bring us all this joy charge fifty cents each for apples, one dollar each for plums, pears, cherries and grapes, and everything else in proportion; but then think how little that is when they will come around every year and care for them for us, and when a few trees or vines will grow directly and without further expense into a great orchard or vineyard.

It also was a great shock to me to learn that the members of this society and the nurserymen of the State at large had intentionally, maliciously and for their own private gain and profit been keeping back this glorious consummation. That while you well know the facts above presented you had studiously and willfully perpetuated the fallacy that varieties of apple, plums, pears and grapes could only be perpetuated true to variety by their bud or scion, and this you had maliciously done, that you might victimize the poor farmers from year to year with that antiquated fraud—grafted or budded fruit. Another matter of sad surprise lies in the reception the angels receive.

It would seem that men bringing such grand and fruitful benefits to our country would be received with open arms, and active encouragement by all, but such is not the history of benefactors of our race. Columbus died in chains, Socrates was poisoned, Christ was crucified, and even these pure-minded men, coming bearing such blessings in their hands, are in trouble. After they had thoroughly canvassed the county, and filled to overflowing their order books, it grieves me to state that even the vice-president of your society, and writer of this paper, friend Ferris, and several others of your county, so far completely sold themselves to the interests of old fogy horticulturists and to the perpetuation of old worn-out theories, that they have actually joined in the persecution of these virtuous men, and assisted the farmers to combine and refuse to accept the great benefits about to be conferred upon them. And now the battle between the farmers and this angelic host waxes hot, and the latest news from the seat of war shows a combination of farmers with funds on hand prepared to fight this benefactor to the last ditch, while the benefactors on the other hand have heeled in their trees, and placed their orders in the hands of attorneys for collection, and the fight is on all along the line.

Gentlemen of the society, there is likely to be some fun in Cerro Gordo this winter; come up and see it.

DISCUSSION.

S. W. FERRIS: The budded tree men circulated the story that my well paying orchard was budded trees and that I was too well informed to plant grafted trees. A customer of these Davenport men asked me to go and see if they were delivering budded trees. I went to their place of delivery, bought a tree of a customer, and cut down through the root and found the splice where the graft was

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inserted. The agent stormed and threatened, but I told his customers that they need not take the trees if they did not want to and I would be responsible for all expenses caused by not taking them. Only about one-third of the trees were taken and none of those refusing to take the bill have been sued.

J. C. FERRIS: A nurseryman who drives out these fellows is looked upon as fighting a rival, but what are we to do? Are we to sit down and let these fellows swindle our neighbors when we known it to be a swindle?

W. A. BURNAP: Is it a fact that any one of our finest fruits will reproduce itself from seeds?

J. C. FERRIS: It is impossible for the finest fruits to do so. The primitive forms will come much closer, but they will not exactly reproduce without variation.

W. A. BURNAP: I was surprised that intelligent farmers could be taken in by this swindle, but after investigating I did not wonder at it. We had a meeting to organize against these fellows and their customers came in. During the meeting an editor came to me and asked where the fraud came in as he was unable to see any fraud in their transactions, and still this editor was intelligent. A good lawyer also asked me the same question, so I concluded that there was a principle in this that is not understood by the masses.

C. L. WATROUS: These things are well understood by those well posted in such matters but most people do not know that a tree is an aggregation of individuals and that to exactly reproduce it must be done by a bud or scion. Seed is nature's way of reproduction and a seedling will always vary from the parent plant. Plants from seed are continually varying to suit the varying conditions of climate, soil, etc. Out of a lot of seed we will get all sorts of variations but never two just alike. Even the same varieties exhibited at Chicago from various places showed great variation. Those men who claimed to have trees that would reproduce themselves from seed and produce fine fruit were swindlers, but there is lots of ignorance on this subject. A man can go out with his tongue tipped with lies, and his face with guile, and sell anything at almost any price. Types may be formed by continued planting of seed and they will nearly reproduce if no other pollen is introduced and no changes of soil or climate takes place. They will never exactly reproduce, but with the same conditions constantly kept up, which is a hard matter to do, they may be made to nearly reproduce.

C. H. GRIFFITH: The trouble is that the farmers are not used to these variations, as the crops they raise are not subject to variation. A farmer plants a certain kind of corn and expects and gets the same kind in the fall.

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SECRETARY: Does he get the same even though he each year carefully selects to keep the original type?

C. H. GRIFFITH: He will get the same kind of corn, but of course the size of ear or kernel or shape of kernel may change or vary, but if he plants white corn he will get white corn.

SECRETARY: That was what I wanted to show. He does not expect to get the same, but carefully selects a few ears for his seed in order to keep the original type, while the bulk of his corn is different, and the farmer perhaps blindly recognizes this principle of variation, but does not apply it to fruit as he does to grain.

C. G. PATTEN: There is not a man in this country or any other that has given his attention to producing fruits that will claim that they will reproduce from seed, and anyone who offers such for sale is a swindler and a fraud, and this can be shown in court.

C. F. GARDNER: I have never known an apple to reproduce itself from seed. We have only one Oldenburg, one Baldwin, one Bellflower, and of all the other varieties not one has ever reproduced itself from seed, and it cannot be done.

D. A. PORTERFIELD: You may get the farmer out of this scrape, and the first cloth pedler, patent medicine man, or fellow with a long string of buggies that comes along, you will have another scrape to get him out of, and you will find that finally you must return to the principle of educating them so they will recognize these swindles.

The following resolution was introduced by W. A. Burnap, and passed unanimously by the society:

Resolved, That the best known fundamental law of horticultural growth is that no cultivated fruit will reproduce itself from the seed true to the variety of the parent, and the statement that any cultivated apple, pear, peach or plum will do so, is palpable and gross mis-statement.

WEDNESDAY MORNING.

The following was read by the writer:

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TAXES ON FARM IMPROVEMENTS.

BY N. A. REEVES, WAVERLY.

The subject assigned me is one of great importance, that of taxing farm improvements. I have been looking this matter up for several years, and while in the main I believe the improvements on the farm should be taxed, still there is one class of improvements that to tax is unjust, and I believe it is detrimental to the best interest of the country. The beautifying of the farm home adds nothing to the income of the farm, it requires labor and money to keep it up, and usually with one year's neglect it has lost its beauty and often looks worse than if nothing had been done.

I have a farm in mind. The husband and wife took great pains to have a beautiful yard, flowers of all kinds that would do in our climate were purchased and cared for, which cost much time and money with no cash profit returned. They had a beautiful yard and how often I have heard the remark, "what a beautiful home they have." After living there many years they sold their home to a man that cared more for fast horses than the fine yard, and now what a change! The yard yet has the beautiful trees and looks well at a distance, but a closer view shows weeds and a tangle of brush and grass. The yard would now look much better if it were only a pasture with no trees. This farm used to be assessed higher than any of the adjoining farms, while now it is assessed lower, yet the profits of the place are now more than they were when the yard was so beautiful. People tell me it is just to assess the beautiful yards, and as a rule it is done.

I know two farms on opposite sides of the road. The land is the same naturally. One farm has the oldest buildings, always kept in good repair, the yard is always neat and tidy with nice trees and shrubbery, and a good garden where they have apples, berries and grapes and plenty of vegetables for the family. This farm is assessed at $12.50 per acre. On the other farm the buildings are neglected and going to decay, the yard is full of weeds and bushes, fences are out of repair, and the hogs in the door yard. Still the income of this last farm is greater than the other, yet it is assessed at $8.00 per acre.

In speaking of these farms to the assessor, I told him that the owner of the run-down farm could show to the assessor the bad condition of his farm, the poor buildings and neglected yards; and tell him of his neighbor's farm across the road, and claim that his place should be assessed less than two-thirds of the well cared for farm, and manages to have it assessed in that way. But if a man comes to buy this run-down farm, the owner is loud in telling him that he cleared more money than his neighbor, and how much

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more his farm is worth. The plan that is usually adopted in assessing improvements to beautify the home, I have long thought was very unjust, and had a tendency to keep farmers from trying to make their homes more beautiful. I have long felt that the legislature should order that in making the home beautiful should not increase the assessment, unless it could be shown that such improvement increased the income of the farm.

Our Iowa is a beautiful State, and it looks to me that all could have almost a paradise of every home if our laws were changed so as to induce people to make their homes homelike. As it now stands, the more beautiful the home is made the higher the taxes, without any regard to what the income may be.

DISCUSSION.

C. L. WATROUS: How are we to improve our present method in this matter unless we educate the assessors? If we can educate all the people up to an appreciation of the beautiful and have all places improved and cared for, it will be all right and taxes will be equal.

D. A. PORTERFIELD: A farm nicely improved with trees will sell better than one not so improved and why not tax it more than the unimproved farm? A nurseryman is not taxed on his stock in trade, while a merchant is taxed on his stock of goods. Why should not trees be taxed as well as other property?

H. W. ASH: I am taxed on my nursery.

S. W. FERRIS: Growing trees are a part of the real estate and should be taxed and valued with it. Stored trees are personal property and liable to tax as such.

J. C. FERRIS: Trees in a nursery are no more assessable than trees in a natural grove and should no more be taxed.

J. W. SMITH: The question resolves itself into this: Elect a good sensible man assessor and he will act justly.

VARIETIES AND LOCALITIES.

BY C. L. WATROUS, DES MOINES.

To me, one of the most fascinating studies has always been botanical geography. From the time when in boyhood I was filled with admiration of the wonderful pictures of nature painted by that master, von Humboldt, in his great "Cosmos," the subject has always been a fascinating one. Why it was that different regions of the earth's surface, apparently enjoying similar bounties of nature, should present such wondrously varying aspects of tree and plant and vine, was something to excite an investigative and inquiring mind.

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Forty years ago, before the time of Darwin and his key of evolution, which has opened so many of the theretofore hidden secrets of the aspects of nature, many things which are now perfectly explained seemed chaotic and unaccountable. It now seems perfectly reasonable to believe that the influence of environment, that is of soil and climate, affords sufficient explanation for all the varying pictures of plant life in each different locality. The first day that I passed among the fruit tables in the Horticultural building at Chicago, brought these reflections strongly back to my mind.

Near our own exhibit was that of Wisconsin with as many strange names as familiar ones in this list. There were seedlings peculiar to that State. In the other direction was the exhibit from Maine, the reddest exhibit in Pomological hall. The reds seemed duller and deeper and the greens much greener, as if the skins were thicker and heavier with pigment, than any specimens from the prairie regions.

The shades of red ran into deep, dull crimsons, while ours ran into pinks and scarlets. In shape their apples inclined more to the conical and ridged, while ours were rounder and smoother and fairer in every way. As to utility, theirs were more pungent and vinous than ours, just as I remember them in my boyhood days in the far east. Passing to Canada and Nova Scotia, we found the same deep, dull reds, and the same thick, heavy greens, though the greens predominated to a far greater degree than the reds. New York showed peculiarities similar to those of Maine and Canada, though in a slightly lesser degree when compared to those of our prairie regions. The prevailing types in all these exhibits differed profoundly from the types prevailing in all the states west of the great lakes and east of the mountains. So much was apparent to the most casual observer of the pomologist. Adjoining the Maine exhibit was one from New South Wales, and there was more than one curiosity. I was asked by the judges to go with a committee of pomologists to endeavor to identify several unknown varieties in the exhibits. Taking advantage of a little leisure, I studied the exhibit somewhat before the time appointed for the meeting of the committee.

One of the handsomest of their varieties was a large, flat, conic apple, with a green skin much covered with russet. It seemed an utter stranger, but bye-and-bye one peculiarity asserted itself. Further along I found one with a red cheek. With a little further study I made up my mind what it was, although the name was entirely strange. The same process brought a like satisfactory conclusion with another variety, though the names were utterly unfamiliar in both cases. When the committee of wise men faced these fruits, no one had a suspicion of the identity of these varieties with anything before known. When I suggested the name of "Rome Beauty" for the first green russet specimens, the suggestion was received with scorn, but when plates of undoubted identity were brought from New York and Illinois, the knife and taste did the rest, and all agreed in the identification.

The same process revealed in the other green and russeted specimens, the familiar Wagener. The surprises and puzzles in the exhibition from the mountains and North Pacific states were almost as perplexing. It was a constant pleasure and profit to have an opportunity to study day by day the wonderful lessons there presented upon the influence of environment in the work of the horticulturist.

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Had circumstances been more favorable I intended to write to you through our home papers of these lessons while they were fresh last summer. Being unable to do that at the time, it was a source of regret that I was unable to present this lesson in my paper read recently before our State Society.

These lessons were not lost upon the pomologists gathered at the fair, and must bear valuable fruit in the near future. Professor Bailey, horticulturist of Cornell University, New York, made an exhaustive study of these things as they appeared to him, and presented his conclusions in a paper before the nurserymen's convention, held upon the fair grounds last June.

He said: "I am greatly impressed with the influence which locality has upon the exhibits. It would seem as if the climate of any geographical region determines very largely the character of all the open air plants which grow there, both in modifying whatever varieties have been permanently introduced and in preventing the establishment of other varieties which may succeed in contiguous areas. Both these influences of climate or locality are admirably shown in the apple exhibits which are now upon the shelves in the horticultural building."

He then gives at length a list of the apples in the exhibits of New York, Illinois, Wisconsin, Washington and New South Wales. But his own words are better than any of mine, and I quote:

"New York undoubtedly leads the states in the actual variety of apples cultivated within its borders, and Pennsylvania is probably entitled to second place. Yet no part of our country has developed ideal or peculiar varieties so quickly as Wisconsin and Minnesota, the fruit lists of those states already containing many varieties of apples and fruits which are unknown outside of that general region. All this indicates that fruits, like other plants, quickly adapt themselves to new conditions through variation into adaptive varieties—a conclusion to which closer study of the above lists brings strong additional evidence.

"In the above lists there are 99 New York varieties, 13 in Illinois, 55 in Wisconsin, 19 in Washington and 13 in New South Wales. Taking the New York list as the basis, we find that 60 per cent of the Illinois varieties occur in it, less than 20 per cent of the Wisconsin, about 50 per cent of the Washington, and about 20 per cent of the New South Wales varieties. These figures show that Wisconsin and New South Wales have an apple flora very different from that of New York, and moreover, these floras are peculiar—that is, different also from the flora of other geographical regions. The Wisconsin-Minnesota apples are more unlike the New York apples in type than the Australian ones are, and they have been developed very largely from an independent stock. If we were to examine the Quebec apples we should find them to be nearer the New York apples in type than the Wisconsin apples are, but we should notice a decided influence of European types.

"From 50 to 60 per cent of the varieties of Illinois and Washington in the above lists are in the New York list, yet the apples of Illinois and Washington are much unlike, and here we come upon a subject to which nurserymen should give particular attention. While Illinois grows many New York varieties, the leading kinds of the Illinois-Missouri region are different

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from the leading kinds in the east. The realm of the Baldwin, Rhode Island Greening, King and Hubbardston is practically bounded by Lake Michigan on the west, and we pass southwestward to the arena of the Ben Davis, Willow Twig, Winesap and Janet, and northwestward into the domain of Oldenburg, Wealthy and Wolf River. But in the far northwest—Idaho, Oregon and Washington — the leading types are drawn from both the east and the Illinois-Missouri region, with the greater part representing admirable, but somewhat local apples in New York State, as Newtown Pippin, Blue Pearmain, White Winter Pearmain, Esopus Spitzenberg, Swaar, to which must be added from the prairie region, Rome Beauty, Ben Davis, Winesap and Janet. But the similarity of this remote apple flora to eastern floras ends with the names of the varieties, for the apples themselves are very unlike ours. They have been modified by climate until they are larger, longer and more conical, frequently marked by prominent ridges at the apex, less firm in flesh and often somewhat inferior in quality. To all intents and purposes many of them are distinct varieties from their parents in the east and they afford as distinct and unequivocal cases of evolutionary modification as the most hypercritical can wish to see. The Newtown Pippin probably affords the best instance of rapid modification of any American fruit. It has always been a local and captious apple in New York State, where it originated, yet in the Piedmont region of Virginia it is the leading apple, known as the Albemarle Pippin; in the far northwest it is again the leading apple over a great territory, and in New South Wales, under the name of Five Crowned Pippin, it is still again a dominant variety. Yet in each of those four geographical regions the variety attains a specific character which it does not possess in others. The Albemarle Pippin differs from the true Newtown in a less heavy and somewhat poorer flesh and poorer keeping qualities; and you can all compare the enormous deep yellow, softer, angular-topped specimens of the Pacific northwest and New South Wales with those of New York. Reviewing these calculations we find three prominent facts: The whole body of the Wisconsin-Minnesota apple flora different from that of New York; the prominent types of the Illinois-Missouri region are different from the prominent types of New York, while many secondary varieties are the same in both. The apples of the Pacific northwest, while transplanted from the east, have developed away from their parent stems.

"The entire horticultural exhibition seems to force conclusions similar to these upon my mind; and it greatly strengthens the conviction which has been strongly growing upon me in recent years that the study of the adaptation of varieties to geographical and local conditions is a most imperative demand in horticultural operations. I therefore look with much distrust upon the promiscuous distribution of varieties over great areas."

These earnest words of Prof. Bailey, who certainly stands in the front rank of intelligent and progressive horticulturists of this country and of the world, are entitled to our gravest consideration. The whole scope and aim of the most interesting and able paper was to discourage the idea of attempting to distribute the same varieties over great areas, and in favor of developing and adapting local varieties in each geographical region. In fact, his paper was entitled "Horticultural Geography," and he says the tendency is, and in his judgment will be, among the best nurserymen

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toward that condition where each will confine himself mainly to supplying the stock which is adapted particularly to his own geographical region, leaving other lands to other men.

Passing to the realms of flowers, the professor believes the disappointments in growing rhododendrons and azaleas have come mainly from attempting to grow varieties of European origin instead of originating varieties of our own, which he thinks we should have done, because the original type from which most of these varieties have grown is a native of our own woods. Horticultural history shows us that the cultivation of the apple, the grape, the strawberry, the raspberry and the gooseberry never became satisfactory in America until we had originated American varieties. I believe the same will be true of this prairie region.

I believe that these lessons will have a peculiar interest to you at this time because of the struggle which has for several years been going on among horticulturists in this State. You know that for the past eight years our State Society, of which you are nearly all members, has had a special appropriation from the State, conditioned upon our using it in the interest of introducing and originating new varieties of fruit specially adapted to this prairie region. You all know that there has not been such teaching to the effect that our wants would be met if we only would devote ourselves with sufficient faith to propagating the hardy fruits from a distant land with climatic features somewhat like our own. It seems to me plain that if the statements and reasons presented in this paper are not entirely fallacious, our great need is to originate from seed grown in our own soil, varieties to suit our peculiar needs. We have seen that the same varieties grown under widely different circumstances have developed into what Prof. Bailey asserts to be to all intents and purposes different varieties, and this has been in spite of continued preparation by grafting and budding, which is simply the extension of the life of the same individual.

If in spite of our faulty methods these varieties have become essentially distinct by the influence of different environments, through nature's effort to adapt them to our ways, you can imagine how much more profound, how much more satisfactory and valuable to the horticulturist would have been these chances if nature had been permitted to follow her own course through seedling variation and survival of the fittest. It is not to be lightly admitted that Washington or New South Wales must forever eat Pearmains of low quality, simply because the individual tree, propagated by bud extension from the original on our Atlantic seaboard, has failed to entirely adapt itself to its changed surroundings. Men will be found there who will sow seeds of these apples, and give our kind grandmother nature a chance to work for us and not against us.

Nor must it be admitted that we on the prairie are in duty bound to spend much time in a vain effort to adapt varieties from distant lands instead of devoting our time and appropriation to originating new varieties by nature's methods. In the light of the climatic effects displayed in the exhibits at Chicago, it should be no wonder to us that we have met so many discouragements and failures in our attempts to adapt fruits of seaboard or foreign lands to the needs of our prairies. That we have had terrible disappointments, and good people have sneered at the work of our horticultural societies is most true, but that the lessons herein set forth are sufficient to throw a broad light over our future pathway, no intelligent mind can doubt.

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The most interesting horticultural exhibit in a scientific way was the display of pedigree plants in the New York exhibit from its experiment station at Geneva. Dozens of seedling strawberries and other fruits were exhibited, plants and fruits together, with their pedigrees plainly stated, and the influence of heredity was as impressively displayed in them as it ever was in the yard of any breeder of horses and cattle.

The president of the Missouri Horticultural Society in discussing this exhibit said: "We have changed our professor of horticulture pretty often of late, and when the last one asked me what we wanted him to do, I said, I am not a professor and probably not competent to advise, but I know of one thing we want and that is something with a pedigree." A professor from the experiment station of another state who was standing near, was asked, "What law of heredity do you know of which is applicable in the breeding of animals and which is not as fully applicable in the breeding of plants and fruits?" His reply was prompt and emphatic, "I know of none."

I believe every man should be faithful to his own household, and I do dislike to criticise anything of Iowa, but I could not help wondering whether it would not have been more profitable to us had the horticultural experiment station of our own State at Ames devoted more time to breeding plants and fruits with pedigrees, and less energy in disseminating and in advertising the virtues of fruits from another hemisphere. Feeling to the utmost the responsibility of what I say, I now declare to you my belief that the members of this society, and of all horticultural societies in the State, would serve the people well if they should unite in a most earnest request to the director of our State Experiment Station at Ames, whose high standing and experience as a scientific stock-breeder, exceptionally well qualifies him to appreciate the force of our reasoning and the justice of our request, that he use his influence with the professor of horticulture at his station, urging him to devote more time and energy to the breeding of fruits with pedigrees, grown from seeds of scientific crosses, and planted in our own soil, and less time to urging the claims of trees and plants from foreign climes.

I asked the director of the New York experiment station for duplicates of some of the pedigree plants shown at the fair. His reply was that they must first be distributed among the nurserymen of his own state. In like manner should not the crosses of plants and fruits obtained at our station at Ames be systematically distributed to the experiment stations of our State Horticultural Society for trial and report, and ought not lists of these crosses be published for our information? These seem to be the living questions that will not be settled and stay settled until they are settled right.

DISCUSSION.

J. C. FERRIS: I appreciate the work done by Mr. Patten and others and would encourage it in every way, but do not want to discourage any introductions of foreign countries. I believe we can improve on nature's plan of propagation and nature's distribution.

N. A. REEVES: Mr. Patten is also carrying out improvements in the line of foreign varieties. He has a great many seedlings of his

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own production, and has already attained grand results, but he also places on his grounds everything that is at all promising.

C. G. PATTEN: At least twelve years ago I presented this subject to the society of seedling production of varieties suited to our wants, and it is a great satisfaction to know that this is endorsed by as able a paper as the one we have heard, and also by so eminent authority as Prof. Bailey. At Dubuque twelve years ago a leading horticulturist said in answer to me that you could not in three hundred years adapt a variety to our wants by seedling production, but I can already show results that you will recognize by looking at the trees I have produced from seed.

B. F. FERRIS: At the Wisconsin meeting two years ago the statement was made that the Longfield was worth more than all other apples, seedlings included, both for market and home use.

C. H. TRUE: I am well pleased with Patten's Greening, and think Mr. Patten's work will do much good to our country, more to our boys than to us. I was well pleased with Longfield as it did well with me at first, but most of my trees became injured on the north side near the ground, and I fear they will not stand well.

J. C. FERRIS: I have no fault to find with Longfield and believe it will be as valuable as though it was produced here from seed. It takes thirty years to produce a seedling and get it properly before the public, so let us accept and make the most of Longfield, Anisim, Hibernal, and all we have of value for the present, as we will not all be here when we get a list of varieties from seed.

C. L. WATROUS: If all the experimenters in the State were dead now, the experiments with all the varieties of Russians would go on and they would all be thoroughly tested as they are now scattered all over the country. We should not throw cold water on any line of experiments, but I believe that now the experiments should take the line of cross-breeding.

THE SECRETARY: There is no conflict between the Russians and seedlings as there is room for all, and for all the experiments we wish to try. Mr. Patten is trying both Russians and seedlings, and is enthusiastic for the seedlings, and I am glad of it, as it will do an immense amount of good in time, and he also holds to the Russian as a number of them are very valuable to us at the present time. Prof. Budd is generally understood to be enthusiastic for the Russians, but he is also pushing experiments in the line of seedling production. He sent us a paper on rose hybrids that will show what he is doing in one line of crossing, and he is working in many other lines as well.

S. W. FERRIS: My Longfield have done remarkably well and bore well, but in 1885 the trees colored about like Wealthy did and have recovered.

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HEDGES.

BY C. F. GARDNER, OSAGE.

The subject assigned to me is one that I am very much interested in, and I am sure that anything that tends to make our homes brighter and pleasant is a subject that interests us all alike. A well kept hedge is an ornament and is always pleasing to the eye. The house may be small and we may have nothing else to attract a stranger's notice, but if we have ornamental trees dotted here and there, and hedges along our front road and driveways, and keep them up as they should be, which is not as big a job as most people imagine, what a change; a stranger driving by wants to know who lives there, and remarks upon the beauty of the place, etc., and if he is hunting for a home how much of a chance has a man who has nothing but perhaps a row of willows on his place, with our man with the hedges, etc., even if his buildings are a great deal better. A person of capital can build fine houses, barns, etc., in a very short time, but trees and hedge plants are something that even his money cannot hurry only inasmuch as taking the best of care of them.

To raise a hedge of any kind the first thing to do is to get the ground ready. Trees of all kinds, and especially small hedge plants, will never do well set in sod. For spring planting the ground should be plowed in the fall. Back-furrow a strip about eight feet wide where you wish to set the hedge; and in the spring, if it is inclined to be soddy, pulverize it thoroughly. Have it in as good shape as if you were intending to raise your prize corn there. When the ground is in this condition you are ready for business. Care should be taken to get your plants where you are sure of getting first class thrifty ones, as lots of money, time and labor is expended in getting stock that has been stunted by being grown too thick in beds, and instead of being branched even and from the ground up, have only a branch here and there and are tall and spindling. Such plants should never be set where you want a nice hedge, and one that will not take a life time to get into the shape that you desire it to. It takes years for plants that have been stunted while small to regain their vigor and to get a good shape to them requires a large amount of work and care.

After procuring your plants, and if you are planting evergreens, great care should be taken not to allow the roots to be exposed a moment to the air and sun, as on a very dry and windy day even a moment's exposure will stunt and dwarf the tree if not kill it outright. Dig the trench according to the size of the roots, and keep this in mind, that it is a great deal better

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to have it a little too large than a little too small. A two to three foot evergreen generally needs a trench about two feet wide and from twelve to eighteen inches deep. A well grown evergreen will make quite a respectable hedge at once, if care is taken to set the tree so that the branches will interlock as much as possible. In planting tread the earth firmly around the roots, and be very careful that there are no air spaces left. If the ground is dry use water in planting, but if it is moist it is not necessary, as then all the good it will do is to pack the earth around the roots as it soaks away. If you use water, put it in after you have pressed the earth firmly about the roots, but be sure to leave loose dry dirt on top. After planting all right, it seems to be the general impression among a good many people that this is all that is needed. They might as well plant corn in the spring and not touch it at all until fall, and then expect to get a good crop as to get a good hedge without care. I would not advise watering at all after plants are set, no matter how dry the season is. If your ground is prepared in good condition with room to cultivate, the best mulch you can get is your cultivator. The drier it gets the oftener you want to go over it, and you will find that the drouth will not affect the growth of your trees but little if at all.

A hedge should be trimmed and shaped as soon as set, and then after that once a year will do, but twice will make a great deal thicker hedge in the shortest time. I have noticed evergreens sheared the latter part of May, and then again in August, after the growth is formed, and they are fifty per cent better than trees grown beside them and sheared only once a year. Take a hedge forty rods long, four feet high, and nearly as wide, and it looks like a formidable job to an inexperienced person to shear it. But with shears for the purpose, which only cost $2.50 at retail, and will last a life time, it is but a short job. We have men to work for us who would be glad to take the job for a day's stint.

As to the varieties best to set, it depends upon what kind of a hedge you want. Some people seem to have an idea that Arbor Vitæ is the only evergreen that will make a good hedge. That this is not so, may readily be seen by the number of fine hedges of other varieties set here and there over the country.

We have on our grounds hedges of the following varieties of evergreens, and to name them in order of rank, as to quality, etc., as they have all had the same care, they would come, in my enumeration, as follows:

First, Norway Spruce; *second*, Balsam Fir; *third*, Arbor Vitæ; *fourth*, Red Cedar.

The Norway Spruce makes a very dense hedge, and it bears the shears with perfect impunity. We have a hedge of this variety that was set about sixteen years ago; it is now perfect in every way, and is so thick that by shaking one end of it you can see the whole hedge quiver. This variety may be kept down to any desired height simply by shearing.

The Balsam Fir has a better color, to my notion, than the spruce, and it also makes a fine and dense hedge.

The Arbor Vitæ and Red Cedar make fine hedges, but do not thicken up as fast as the first two varieties named.

Selected blue trees of the *Picea pungens*, or Silver Spruce, would make a beautiful hedge. I think that of all the varieties of evergreens now grown, the Silver Spruce ranks first in beauty, and I believe that in the near future

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it is destined to take the lead and be planted more than any other variety grown.

The Barberry makes a quick and very fine hedge. This hedge planted right and taken care of, after three years' growth will turn any kind of stock. I have seen hedges where I don't believe that even a small chicken could get through it. It makes a very cheap hedge, as the cost of one-year plants and setting would not exceed fifty cents per rod. It is a very fast grower when young, and if not sheared will attain the height of from fifteen to twenty feet. It bears an abundance of bright, red fruit which not only looks very beautiful on the hedge, but makes very fine jelly. This plant is perfectly hardy here and should be planted more extensively.

DISCUSSION.

N. A. REEVES: Is there anything more beautiful than the hemlock? It makes the finest hedge I ever saw.

C. E. GARDNER: It is nice but I prefer the spruce.

C. H. TRUE: Hemlock makes a fine hedge and is the most delicate tree we have for that purpose. Arbor Vitæ is second and red cedar third. I have a hedge of the last named but would not plant it again as we have better trees.

DR. J. W. SMITH: A hedge may be planted so it will be a bad thing. If planted too close to the house it causes snow to drift and holds dampness after rain and is unhealthy.

W. A. BURNAP: I object to hedges on small lots and in cemeteries but on the farm they are all right.

C. F. GARDNER: A hedge cannot be filled out successfully where plants die after it gets started.

SOME RESULTS OBTAINED IN CROSSING CUCURBITS.

BY L. H. PAMMEL, AMES.

In 1892 the secretary of your society requested the writer to continue his experiments in the crossing of cucurbits, and I am glad at this time to be able to comply with his request.

The writer has, on several occasions, expressed his views on the subject "Crossing of Cucurbits." My views have been expressed in various papers and have met with some opposition among professional gardeners, horticulturists and farmers, many of these cling tenaciously to the old notion that "pumpkins and melons will mix." So far as I know the results of our work at the Iowa Experiment Station are in harmony with those made at other stations. They are also in harmony with the investigations of European botanists. In my report to this

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society in 1892 I gave the results of my work of that season. I then showed that the different species of cucurbits will not "mix." The hand pollinations were made by myself, Messrs. Stewart, Carver and Brown. Great care was taken to eliminate all errors. The pollinations were made at different times of the day. Plants were grown intermingled with each other. The results show that it was impossible to obtain fruit when pumpkin pollen was placed on the stigma of the squash, and vice versa. When pumpkin pollen was placed on the stigma of watermelon flowers they invariably resulted in failures, except in one case, and in this the cucumber beetle probably carried pollen from other melons, so too with cucumbers and muskmelons. It was also shown that muskmelon pollen placed on the stigma of cucumber invariably resulted in failure to set fruit. These experiments agree entirely with those made by Professors Bailey and Munson, and that eminent French experimenter, Naudin, who long ago made experiments with this interesting group of plants. There is much confusion in the popular mind in regard to the different species of cucurbits, and many of the erroneous views in regard to the cucurbits arise from this fact. In a coming bulletin of the experiment station I have made brief descriptions of the different species so that it will be possible to recognize them and I hope this will do something towards straightening out some of the confusion.

In the spring of 1893 the writer set out a plot of mixed seed of the various forms of cucurbits grown in 1892. In this way we obtained representatives of the different kinds of specimens, and it was possible to determine clearly whether there was any "mixing." We also saved the seed of our hand-crossed plants which were set by themselves in close proximity to the mixed seed, *but in not a single case has there been any evidence of "mixing" of melons with pumpkins, pumpkins with squashes*—and by squashes I mean the type represented by the Hubbard, Mammoth, Chili, Marblehead, etc.—*muskmelons with cucumbers or cucumbers with watermelons.* Our work is interesting in showing the immediate effects of crossing. Our observations show that there is no immediate effect whatever, and this is in conformity with the experiments made by Professor Bailey. It is well known, however, that in some plants there is an immediate effect. Our experiments show interesting results in the prepotent influence of male and female plants.

It has been shown by numerous experimenters that when two races are crossed, or the product of hybrids obtained by hybridizing two species, the result is a blending of the characters of both. It has even been asserted by some investigators that this character is shown in the make-up of the cell tissues.

Taking our random notes, we note that in Nest-egg Gourd the structure of the fruit, character of the vines and leaf partakes more of the Nest-egg Gourd than the pollen from which it came. The fruit was poor in quality, rind tough and scarcely fit for culinary purposes.

Perfect Gem.—In 1892 we observed that this variety in some cases was not true to type; the vines and seeds of the different kinds were selected and planted this spring. In this lot we found many different forms; few noted were of the type, some plants showed Common Pumpkin, and a few were warted; some were considerably elongated or barrel-shaped, but the vines in all cases approached Perfect Gem. The Perfection Gem Watermelon seeds planted in 1893 produced vigorous, healthy and well grown plants. The melons were of two types, one large and of the type of Perfection Gem, but the leaves were coarser; the second was evidently crossed with pollen of the same variety. Its leaves were somewhat finely divided, the fruit in both cases was of high quality and showed no indication whatever of "mixing." In 1892 the seed from which they came were growing, in some cases,

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among the pumpkin vines, which actually covered the melon. The same may be said of the Montreal Improved Muskmelon, and yet they show no evidence whatever of "mixing."

At a recent meeting of the Southeastern Iowa Horticultural Society the writer brought up the question of mixing of pumpkins and melons, and Mr. J. H. Hoopes, of Muscatine, a prominent grower of melons, said that watermelons grown on clay loam or black soil had a peculiar taste; they were more stringy than those grown on sandy soils. He did not know as to the "mixing" of pumpkins and melons, but was certain that soil greatly influenced the quality of the melon.

The following committee was appointed on first award: N. A Reeves, C. P. Trescott, P. F. Kinne.

WEDNESDAY AFTERNOON.

The following on top-grafting was read by Mr. Gaylord, after which Mr. Patten gave the experience of a great many experimenters in the line of top-grafting. As his work was laid out by the State society, his report will properly become a part of their report.

TOP GRAFTING.

BY EDSON GAYLORD, NORA SPRINGS.

The ancients, two thousand years ago, were known to have practiced top-working. Paul recognized this art as being well known in his day, and spoke very emphatically of the superior results to be expected from using both for stock and scion, their best and highest cultivated varieties. I favored the Siberians, and the crab family for our stock trees for many years. They would bear sooner and more profusely, but I soon found they were short lived. For these and other reasons I have discarded them.

Twenty-five years ago I grafted many choice varieties of tame plums on to our wild trees. They grew finely the first two seasons, but the second winter killed all and chilled my ardor for a time. Later I learned of some choice plums near the north line of Kansas; scions from these grew finely. The next spring I found the young trees killed to the ground. Then I hastened to examine those I had grafted on wild stocks; *every bud was perfect*, and these trees have been bearing seven years or more and show no signs of injury. Fourteen years ago I grafted into hardy young trees Fall Orange, Ben Davis and Minkler, *three well known tender*

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varieties; they have been bearing eight and ten years. These tests of my own and those of my near neighbor, Mr. Heisz, have so firmly established my confidence in our final success through top-grafting that I have made scarcely any other effort to grow any variety on its own stem, excepting those varieties known to be extremely hardy. I am often asked what varieties do we expect to succeed with hat we have been unable to grow successfully on their own stems. This list would be too long to mention here.

I am often asked "how do you expect to succeed when you have admitted in your last report that you find a world of failures wherever you go to investigate this work?"

We have spoken in last report of Wealthy trees on Oldenburg now over twenty-three years old, large and sound as any Oldenburg, and now defy an expert to tell just where the scions were inserted. In the same orchard stands a number of Fall Orange trees sound where top-grafted, while those on their own trunks have failed root and branch. Nurserymen and salesmen have as a rule steadily opposed this new departure. They saw at a glance that such trees would prove a very unprofitable and unpleasant thing to handle.

The time has now come when every child should be taught the few chief principles of horticulture in every common school. As much as I love music, if it or horticulture must stay out, I would say retain the latter. Let every child be taught to set out and grow trees, and first and foremost of all, let every boy be taught to top-graft, and this by the best approved plans known to modern horticulture.

Top-grafting to secure more hardiness is but an infant just born; and—lucky for us—born right here, and hence is bound to *stay with us.* But this infant needs a world of care, its wants are numerous, and the best of us have now only a faint conception of just what its *real* wants are. But the leaven is in the lump.

For those who have not studied this subject, I will simply add a few hasty suggestions. First, if you have any hardy Siberian crabs, hybrids, or better than all these, if you have young Hibernal, Oldenburg, Tetofsky, or Whitney, get the scions of all or any varieties you have heretofore partially succeeded with, and top-graft them well up in the tops. Better get the instructions necessary, not from any old eastern grafter, he will do you more harm than good, but from some one you know has had years of experience *in this, your own climate.* In my many years of study and practice in this work, I have learned only a little of what I feel confident will be brought out and made plain during the next quarter of a century. But to all who are ready and anxious to commence this good work anew I will suggest that you secure the needed number of Hibernal and Oldenburg; add to these the Virginia crab, which is not a crab but a large strong growing apple tree found in the Russian forests. These three I deem our best; there may be others equally good, but these have been tested the longest, and in numerous cases have proven eminently successful. I would prefer stock trees to be from five to seven years old before grafting, so they have an identity of their own. There is considerable evidence going to show that trees grafted too young are liable to lose their identity in their trunks and roots. This is one of our *unsolved problems.* But graft out in the branches five, seven, or more inches, and try *as far as possible to set every graft as near towards the sun at half past one,* and grow them mainly in the same course. This is an additional accompaniment of successful orcharding, but very necessary. Reverse this and our best efforts will prove failures. All I will add here is to say to all—investigate for yourselves. Keep a sharp eye on the man you engage to do your top-grafting. When you learn he is doing your work more for

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the money he sees in it than for the success that should follow, discharge him at once. Send for your school teacher and if he knows nothing about this work discharge him, and know better whom you employ in the future.

DISCUSSION.

S. W. FERRIS: Pewaukee does well on Transcendent.

C. G. PATTEN: It makes a great difference how much of the stock is used in top-grafting unless you are sure the variety is well adapted to the stock you use. If not well adapted it is best to graft low as, if grafted high in the limbs, it will fail, but if well suited it is best to graft in the limbs. Oldenburg is a perfect stock for Wealthy and I would work it in the limbs. This method increases the hardiness of a tree from ten to twenty-five per cent. The scion has a reciprocal influence on the stock.

EDSON GAYLORD: Pewaukee on Oldenburg failed.

S. W. FERRIS: Plumb's Cider on yellow crab grew and bore well for a time and then failed. Wealthy on Transcendent has done the best of any. Could not detect a difference in the quality of the fruit whether part of the crab top was left or not.

C. H. TRUE: Does top grafting induce early bearing?

S. W. FERRIS: When we graft a scar is made similar to ringing a tree and it will usually bear in a year or two but if the union is perfect it will soon have no effect.

H. W. ASH: Red Astrachan on Tetofsky is reported to be very productive.

N. A. REEVES: Red Astrachan outgrows Tetofsky, and is it not usual for that to cause a tree to bear?

C. G. PATTEN: No.

N. A. REEVES: Oldenburg has not been a good stock with me, as the grafts grew and all blighted out. Jonathan, that bore a barrel of fruit, all blighted where you could not detect the union. All I have seen grafted on Oldenburg has blighted, while Wealthy on Yellow crab does well.

J. B. MITCHELL: I grafted a seedling sweet apple on Oldenburg a few years ago and the union is perfect.

M. H. NICKERSON: Wealthy on Oldenburg at Mr. Heisz's is the most perfect of any.

C. H. GRIFFITH: While at the college a few years ago I saw blocks of trees that were perfect and Prof. Budd said that the Russian tops made the Gros Pomier stocks hardier.

EDSON GAYLORD: Mr. Henry has Jonathan on Minnesota crab that bears well.

C. L. WATROUS: B. A. Mathews, of Knoxville, grows pears by

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setting a hardy tree and in a few years he puts in scions and has good success growing pears.

J. C. FERRIS: Whitney is a good stock for almost everything. It is thrifty and not subject to blight and is second to Virginia as a stock.

P. F. KINNE: Whitney does not do well in western Iowa, as the trees bark-burst although they make a good union.

C. G. PATTEN: Shields' crab originated in Walworth county, Wisconsin, about thirty years ago. I have never had it blight, and Wolf River and my Oldenburg Seedling No. 8. are doing well on it.

PRUNING NEWLY SET TREES.

BY J. B. MITCHELL, CRESCO.

If I rightly understand this subject as it reads, it confines the writer to the pruning of trees in the season in which they are planted only, or in other words, the cutting back of top to balance the loss of roots in digging. A paper on this subject written along the line of popular belief or general practice might be somewhat extended theoretically, but those of you who have read my paper on "Handling and Planting Trees," in our report of 1892, will not expect to find me in that old rut and will not be surprised when I say any pruning of trees when they are set, or during the first year after they are planted, other than to smooth off the bruised ends of the roots, remove a broken branch or one that has failed to grow later in the season, is worse than useless.

I am aware this is a wide stride from the old creed, and that I may be laying myself liable to be called a "crank," but let me remind you that all the machinery at the "White City" and the great Ferris wheel was turned by a crank, and it may appear in the next paper to be read on pruning that our Sol has been moved by a "crank."

It has been my practice for several years not to do any pruning on trees when setting them. I give the same instructions to my patrons, and the results have been so satisfactory that I shall continue to do so believing it is best.

It is now generally conceded by those with the most experience in pruning in northern Iowa, that a wound made when the tree is in its most rapid growth will heal soonest. To prune a newly set tree is to do so when it necessarily is making a very slow growth, and the cut surface does not heal but remains open and exposed to evaporation, which is very injurious to the wood below. If one year wood only is cut, the bad effect is not so obvious, but if a branch is cut from two year old wood or older, it will be several years before the wound is covered, and if you will notice at the end of the season's growth when the sap is returning, you will see it oozing from the wound, and more especially so if the branch has been cut from the body of the tree. If you have not noticed this leakage of sap, you

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probably have the blackened bark below the wound caused by the sap corroding there.

This cuttting is not necessary. It has been my observation that a tree properly pruned while young and growing in nursery has no more top than can be maintained in a healthy condition by the roots left, even if cut quite short in digging, and the tree will be in much better condition two years from planting than if robbed of its terminal buds when planted, because these buds are always the first in leaf and the ones that start an early growth and set the sap in motion and prevent the tree from drying up.

It is true you will often get a longer single growth on a tree that has been cut back than on one planted with the top uncut, but I do not find as many inches or feet of total growth on a cut-back tree as on the other. The latter has more points of growth, and although short, it is enough to keep the body of the tree healthy and repair the root system for a good growth the next season, and the tree is spared the dark streaks running down in the wood caused by the evaporation from the cut surface exposed to the drying winds of our climate.

This paper is necessarily short from the fact that I did not receive the program until my return from the meeting of the Southern Minnesota Horticultural Society, and it was short notice, otherwise I might have extended it, but perhaps its merit is that it is short. If it induces others to experiment in not pruning newly planted trees I think it will have added merit.

DISCUSSION.

S. W. FERRIS: If the tree is in a perfect condition it will do well if all the top is left. If it has been weakened by exposure it should be trimmed, and there is not enough sap to ooze out of the cut surface. If the trunk is wound with wet cloths and these wet each night and the tree mulched, it will bring the tree out all right. This is the plan adopted in many places in setting street trees, trees with poor roots and those dug from the forest. A large limb cut off is sure to cause a tree to rot in our dry climate, but a tree may be pruned two or three years after setting with less injury than when first set.

J. W. SMITH: It is a good plan to keep your knife in your pocket while in the orchard, especially if you are surgically inclined.

J. M. ELDER: I cut out the center of a lot of Whitneys and covered the cuts over with wax and they healed over all right. Whenever you pass beyond the climatic limit of any tree it tends to become scrubby. If we succeed with the apple here we must grow them low.

J. B. MITCHELL: Prune as little as possible when planting. Do your pruning while the trees are growing most rapidly. If a tree is exposed so it is shriveled, bury it for a few days and then plant it even if it is late and it will grow all right.

N. A. REEVES: In the east we had an orchard of seedlings top-grafted and we could ride a horse under the limbs. It has been tried here and failed. In an early day I saw some trees at Colesburg and the ones with lowest limbs did best. I now have trees ten inches in

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diameter with limbs a foot from the ground and so they have no trunk to sun-scald. I always regret to have a limb cut from an apple tree. I have cut the top off a maple or other tree when setting even to a stub and had good success.

C. H. GRIFFITH: If a limb does not suit me I cut it off when setting and cover the wound with wax. Mulch the trees and wind the trunk with cloth or hay bands and they will not dry out.

WEDNESDAY EVENING.

Called to order by President Ash.

The society voted to pay the expenses of E. Reeves as delegate to the meeting of the Northwestern society.

PRESIDENT'S ANNUAL ADDRESS.

BY H. W. ASH, WEST UNION.

Time in its onward sweep has completed the cycle of another year. It is with becoming gratitude to the Omnipotent power, that controls and guides alike the actions and destinies of the individual and associations thereof, that we meet again under so many happy and felicitous circumstances, conspiring to make this annual gathering an assured success.

Thankful hearts have a wonderful power to infuse the individual, and an association of this nature, with an amity I hope to be well nigh universal. When it was decided by vote of the members at the last session in Humboldt, that we should meet this year in Charles City, I confess there was a glow of satisfaction in my heart, which has continued to infuse itself until it has so completely filled my whole being, that I cannot restrain myself from congratulating the members of the Horticultural Society on the selection of this beautiful city as the place of our annual reunion.

Not alone for its scenic beauty, though that is charming and attractive; nor yet because of the culture, generosity and well-known progressive character of its citizens, though these are commendable and worthy your emulation, but because there resides in juxtaposition to this city a horticulturist of so eminent ability that his name is a synonym with advanced thinking and erudite knowledge in that field of investigation, in which so many of us are as yet but beginners.

Without doubt you have heard of the nurseries contiguous; the many amateur

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fruit growers in this vicinity, and the wish, almost determination, of these growers, to impress you with the fact, not susceptible of successful contradiction, that their ways, methods and results are the most satisfactory ever yet attained.

My fellow members, I trust you will be attentive to those upon the program, and do not let any of the subjects under consideration pass by until they have been fully elucidated.

Sometimes the writer or speaker is timid and does not spontaneously give out the valuable knowledge he possesses. With kindly consideration and such tact as you possess, endeavor to encourage the individual to impart all the information upon the subject under consideration.

"The half has never been told" is a popular song sweet with melody, but it is of the sentiment I wish to speak—to urge upon you to lay fast hold upon, for never have I been at a gathering of fruit men where the *half has ever been told*.

The record of the past year has been filed in the archives of time. If it be success, satisfied achievement, loftiest endeavor, I congratulate you. If failure, the loss of despair, the gloom of unrequited toil, I bid you arise above these depressing environments. More often from seeming failure comes the most enduring success.

I apprehend the greatest object of this society is the promotion of horticultural knowledge—simple, practical and technical information that will most surely lead the follower to ultimate reward.

To start aright is absolutely necessary. If you plant an orchard, set a berry garden or attempt the adornment of your home surroundings, you will need to add to your judgment and artistic sense of arrangement, the combined wisdom and expert knowledge of this and similar societies, whose individual members each have made a life-long study of some special subject. They have arrived in an eminent degree at safe and valuable conclusions.

Notwithstanding this most unfavorable year in apple-growing, we have in northeastern Iowa no inconsiderable amount of this valuable fruit. I would not depreciate the value of soil, location, exposure and various other requisites to successful apple-growing, but I deem it wise to lay particular emphasis upon the selection of varieties.

There has been planted in the past many kinds that were entirely worthless. There will be in the future. How best to convey to the apple tree planting public the knowledge of varieties that will most surely bring them the safest returns, should engage your earnest consideration. The average planter left to himself, or such information as he would most likely acquire from known successful growers or the perusal of literature of a horticultural nature, would make fairly good selections. At least the varieties and numbers would be the result of his judgment and acquired information. However, this is seldom the case. Many, very many, of the selections of varieties and numbers thereof are made for the planter by the solicitor of the order.

While they may or may not possess more knowledge than the purchaser, experience has demonstrated that the successful orchardist is the one who is able and capable of making a selection.

It is worthy your careful consideration how best to promote the information that will enable the planter to gain and use the knowledge this society possesses of the value and adaptability of the various orchard fruits. If the present method of recording the vote of the members and practical fruit growers, upon the value of the varieties is to be retained, it becomes essential, in my opinion, that the result should be so formulated, that the standing of the varieties may be known,

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relatively, so to speak, at a glance by those who in a great degree expect to have, what should be their thinking, wrought out for them. It is oft times better to seek to improve the efficacy of a tried method than to abandon it for a new one, or go back to the old, known to have serious defects. However, if the older method of fruit lists be made the authorative standard of this society you should seek to eliminate, by wise council and unprejudiced judgment, those tendencies that detracted from its value.

I have dwelt upon this subject with the hope you would be moved to action for I am profoundly impressed with the fact that success or failure depends largely upon the hardiness, adaptability and value of the variety planted. It is a well known and pleasant fact to the members of this society that largely increased plantings of the orchard fruits have been made the past year. It is still more pleasant to reflect that the prospect of an increased number of them, or percentage of these plantings give evidence of hardiness, fruitfulness and value.

In your councils will you give consideration to the best methods for their productiveness? It may be known to you, but you would be derelict to your duty if you do not record in your transactions that information that would be of value to them. It is now known that perfectly hardy varieties of fine quality of fruit may be rendered non-productive by imperfect fertilization. This usually occurs where large numbers of the same variety are set in adjoining rows. How best to overcome this deficiency of pollenization in orchards now planted, and its prevention in the future will, I trust, be made plain to the ever increasing number of readers of our reports. Last year I placed some stress upon a subject which I am pleased to know has made progress.

The action of this society was encouraging. You have abundant evidence that there is need of united, persistent action. You have but to see the deformed, diseased and defective orchard fruits to be impressed with the value of preventives.

Spraying with insecticides and fungicides is no longer a question of value. That there will be improvements in the solutions, their efficiency increased and cost lessened, I have no doubt; but the great *problem yet unsolved* is how to get them applied. The cost of the apparatus and the natural reluctance of most persons to buying, mixing and using poisonous substances, will prevent for some time its general use. I know of no better way than that presented to you last year. Co-operation would in a measure meet the exigency; but the making of its application at the proper time a regular business by an individual or firm, I believe to be the most practical and efficient way of combating this evil. It may be possible that a committee of experts from your number might be able to formulate some plan that would increase the use of spraying; and I would respectfully suggest that such action as you in your judgment deem expedient will be taken.

It sometimes happens that the recipients of a bountiful crop of fruits find the product to be difficult of remunerative disposal. Co-operation of growers in disposal of the surplus is receiving consideration in many localities. Wise and practical measures are not always used. Information that will reduce to a minimum the cost, and increase the usefulness of concerted action in the disposal—during the flood period—of our fruits would be of great value.

Cold storage as a means of preserving for future use or sale of our perishable fruits, is susceptible of utilization. The preservation by cold storage of our fall apples and the placing of them on the market or retaining them for home use in the pristine quality, would help to solve many problems. If it can be successfully accomplished at a moderate cost it will make certain the disposal of a class of fruit that has caused some anxiety to growers. More important still will be its

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bearing upon the production of the high colored, fine flavored fall apples. It will in a measure solve what seems to many unattainable—the necessity of growing winter apples.

It is not probable that we will be able to grow a fruit with keeping qualities that will carry it six months beyond the time of maturity, that can possess quality at all comparable with our best fall varieties. The further utilization of the various fruits by evaporation, canning and preserving, both by the producer and by firms fitted with plants to successfully handle large quantities, are subjects prolific of thought and worthy your consideration. It gives me great pleasure to record the increased interest taken by the general planter and commercial orchardist in the transactions of this society. You will reciprocate by aiding and advising in all legitimate and honorable ways.

The planting and production of the small fruits, including the grape is receiving increased attention. In the older eastern states the question is sometimes discussed—are we growing too many of the small fruits? Or is there an over production?

These may be pertinent subjects in these old communities, where large areas are planted. However, there seems to be an almost entire unanimity of opinion, that they have not near reached the limit of desirable or remunerative production. If this be true of those communities, and I have no reason to doubt it, it must be apparent that we with our rapid increase in population and limited production will have many years before us, ere we have to provide for over-production.

The growing demand with us has far exceeded the output. It is easier now to dispose of ten quarts of strawberries per capita, than it was only a decade ago to induce the purchase of a single quart to the person. The growing knowledge among the masses of the proper food for our physical systems has in a marked degree increased the consumption of edible fruits. The rapid advance in current public opinion upon the hygienic value of the acids and other nutritive properties, found in their natural state only in the fruits that are susceptible of successful growth in our climate, leads us to a pardonable pride that horticulturists are and have been public benefactors.

Are we content with what we have done? Shall we rest upon the progress made? Is not the limit of desirable varieties of the apple reached? Have we not native and foreign born? Hybrids, crosses and sub-crosses innumerable? Is it not each year becoming more and more difficult to determine to which of the foregoing a new variety can trace its ancestry? Are we breeding fruits? If not, why not?

There is something in the air that is breathed, the grasses and oats eaten, that has produced an Axtell and Allerton, the peers of any horseflesh that has ever trod Iowa's inimitable prairies. The same natural elements that entered into the component parts to give us these equine marvels of the age, can and will grow for us apples and fruits the peers of any the sun ever shone upon.

When we bring to bear upon the production of each recurring generation of tree or fruit the laws of scientific breeding, we may expect new and better qualities than those of its progenitors.

Not until the ultimate limit is reached can or will we be satisfied. The ever recurring improvement will only stimulate you to renewed effort until the achievement acquired will be beyond the power of my pen or imagination to portray.

The various conifers have been planted in largely increased numbers.

Our rural communities are beginning to realize the practical value of the evergreen. As a wind-break and shelter belt they force utility upon the most careless

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and conservative. Few progressive farmers are without one. Their absence is indicative of a lack of energy, carelessness or knowledge lamentable to see in this advanced age. Not alone for their practical value in sheltering and protecting his buildings and home from the fierce boreal blasts that are not yet strangers to Iowa climate; but the beautifying and refining influence they give to his home is of inestimable consequence.

The relative value, adaptability and utility of the various members of the conifer family should, and no doubt will receive from you, such consideration as their merit demands.

There is still among the masses an absence of technical knowledge of the best ways to transplant, care for and successfully grow the evergreen.

The hand of man continues to cut down, destroy and completely obliterate our natural, primeval forests. The wooded picket outposts upon the prairie fell first before the conquering onward march of the Caucasian. Soon, before the cupidity of Mammon, fell the giants of the forest; to-day the commercial value of our native timbers for export is a mere pittance.

From within and without the denuding process goes on; the mound, the valley, the steep hillside, one and all alike are being cleared of their aboreal vegetation. Where once the rains fell upon beds of leaves and slowly percolated to levels below, they now fall on barren hillsides. The surplus rain falling in torrential volumes carries the fertile mold to the stream, river, sea, and beyond the use of man. But why mention, much less dwell upon, the calamitous results following the destruction of the natural primitive forests? Is it not known that less frequent rains, more torrential in character, result? Is there any one ignorant of the ameliorating influence of the wooded plain or hillside, when the scorching south wind is stopped in its leafy embrace, or the fierce blizzard tamed by its Titanic force? If the average of the summer does not become more torrid, the winter more frigid; is there anyone who does not realize that the extremes in heat and cold are greatly augmented? I do not suppose the intelligent people of this commonwealth are ignorant of the teachings of history.

It is not possible to read of the rise and fall of nations and go back to their primal causes that produced them, without being profoundly impressed with the fact that when, in the course of events, the natural relation between the forest cover and arable land was disturbed, the *elements of strength* of that nation and country *slowly*, but none the less *surely*, were lost. It takes a long time to change deep rooted tendencies. Forest destruction is a heritage we received from our forefathers. New ideas upon forest preservation are rapidly changing public opinion. This favorable change in sentiment you should endeavor to give wide dissemination. It is within the province of your privilege to recommend to our General Assembly the enactment of such a law as will in your judgment stay the destroying tendencies and encourage the re-foresting of areas already stripped of their valuable wood growth. In this connection you can consider the expediency of artificial timber planting and the encouragement that should be given it.

It has occurred to me many times that we have not given the attention to this subject its merit deserves. There are great possibilities, economical and financial, for those who plant our best conifer and deciduous trees. Somewhere in the realm of literature or the writings of the sages, the statement is recorded: "The home and the surroundings is the visible exponent of the thoughts, aspirations and artistic sense of the beautiful of the owner or occupant." The architect passes the wand of beauty over the spot that is to be the future home, and lo! there arises the building of convenience, harmony and proportion. The artist, for he must be

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more than a drawer of lines and measurer of distances, will ascertain the wants and wishes of the builders, and so far as is consistent with harmony, proportion, and availability of space, follow the wishes of the expectant occupant. He will work out and show in detail all the various parts, interior and exterior views, cross-sections with explanations and minutia so explicit that it is made plain to the most slow of comprehension.

What the architect does for the house, the landscape artist should do for the grounds. Like the former, he must be more than a measurer of distances; his artistic knowledge of harmony, proportion and utility of design should guide and direct. To some of you may arise the query, if we are to delegate the arrangement and design of our house and grounds to the artistic expert, how can the individuality of the owner be shown in his home and environment? The authors of the books in my library are literary beyond my power of attainment, but their selection is the exponent of my literary wishes, aspirations and tendencies.

This plea for the utilization of the highest artistic talent available in the adornment of our homes, renders more imperative the cultivation of the endowments bestowed upon you; that you may make your home, the arrangement and landscape effect, a reflex of the character within you.

The mass of our citizens have reached that degree of affluence which will permit their indulgence in artistic adornment of their home grounds with the choicest trees and shrubs. Flowers, the Forget-me-nots of the angels, with color and odor should lend enchantment to that place most sacred of all—*home*.

The preparation of the program has largely devolved upon the secretary. Conflicting dates of other societies, the financial stringency, prevailing la grippe, and near approach to the holidays have been some of the difficulties encountered by him. When these and other obstacles are considered, we will accord to him zeal, enthusiasm and ability. There should be at least one meeting of the executive board prior to the time of making up the program. The time and labor of these gentlemen would be willingly given, but the traveling and other expenses should be paid out of the funds of the society.

I am not aware that the expenses of any of the officers of this society are provided for or have been paid in the past years. I know from experience there is a large correspondence devolving upon the president. While I would not recommend an allowance to be made for this work, I am quite positive that remuneration for stationery, stamps and expense of attendance at the annual sessions would not only be just and right, but the spirit of payment for value received.

It is hoped that the sessions of this society will be well attended. It is one of the things that no community can afford to let pass by without being present and taking part in the deliberations.

You are cordially invited. On behalf of this society I extend you welcome. We want to make this gathering a success. We desire your presence. Will you not grant this boon to us? Not until you become a devotee of Horticulture, the highest culture of agriculture, will our mission have been fully attained.

The president's address was referred to the following committee: S. W. Ferris, D. McGregor, Edward Hoyt.

The secretary reported favorably and it was voted to accept and allow his account as stated, after which the treasurer presented his report and it was referred to the following committee: E. M. Sherman, C. F. Gardner, B. F. Ferris.

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The following paper was read by D. J. Purdy, a fruit dealer of considerable experience:

FRUITS OF THIS COUNTRY FROM A BUYER'S STANDPOINT.

BY D. J. PURDY, MASON CITY.

In the fall of 1869 we bought one hundred barrels of apples for our market and it seemed well supplied. In 1889 we bought one hundred and ten car loads and they were sold at a profit. During the twenty-five years we have been in the business we have been compelled to search all the western states, where fruits are grown, and in many cases nearly all the eastern states also. About fifteen years ago the supply seemed greater than the demand, caused by lack of knowledge of the market and not knowing how to put the fruit on said market. Next came the false cry of over-production, which cry caused neglect of the whole business over a large part of this country.

Having been born and raised in an orchard, we closely examine every orchard we see; and for about ten years have made the assertion that twenty trees are dying from age and neglect, where *one* tree is being planted and cared for. This we apply to the whole country and all fruit-bearing trees this side of the Rockies, and we find nobody to deny the fact. Add to this the fact that the demand for fruit more than doubles every ten years; and what are we coming to? Why, a fruit famine except for the rich.

In this western country we admit that we eat pork, but where are the people who eat inferior meat? Yet this is just what the growers east and south of us try to do with the dealer and consumer. Illustration: Why pack and ship rough, crooked and wormy fruit? "Just because it grows that way?" Why has it grown that way? neglect, no, *laziness*.

In our search for fruits we find that the party who prunes well, cultivates thoroughly, and thins extravagantly, obtains premium fruit. Not one orchard in fifty has the least chance to produce good fruit.

Two years ago we packed an orchard, of twenty-five acres, just west of Marshalltown. The farmer's turkeys and chickens had saved about three acres from the codling moth; the balance was destroyed from lack of cultivation; the hay in said orchard kept the chickens from finding the moth. The farmer's loss that year must have been about $500.

The Iowa Oldenburg and Wealthy, if largely planted and well cared for, would soon be the leading apples in all our great cities; a car of one packing two years ago, just made the leading cities of Ohio more than wild for them. Since then we have been flooded with calls for Oldenburg. In the east they know very little about the Oldenburg and Wealthy. They both make a good cold storage apple, and kept in this way our home market is endless and never likely to be well supplied.

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A few years ago Mr. Vernal, a farmer in our county, astonished us by saying he had Oldenburg in February, which he proved some two weeks later by bringing us a fine sample. They were picked a little green and kept on the ground floor of a damp cellar near a spring.

Cold storage Oldenburg usually bring $4.00 to $5.00 a barrel. Why do we grow wheat, oats, corn, hay, horses, beef and pork and ship to foreign markets, and go to the ends of the earth for our fruits, thus paying freight both ways and very many and large margins?

We talk about the rush of this country, its railroads, telegraphs, telephones, flying ships and world's fairs, but we need an earthquake to wake up the farmers to the demands of this fruit-loving people; one-tenth of the western people, men, women and children, in addition to those already at it, could and should be on small fruit farms, to all our advantage.

We are making every effort to launch our boat on these waters and have but little idea but we can float.

DISCUSSION.

After reading his paper Mr. Purdy was questioned by those present, and the following is a part of the information given in his replies:

D. J. PURDY: There is no necessity of spraying in an orchard of ten acres or less if the owner will keep plenty of chickens and turkeys, and keep the grass cut. The fowls will rid the orchard of insects.

There is but little known on the markets of the Oldenburg, but it is one of the best market apples. Iowa Oldenburg would lead the world if properly grown and packed for market. Two years ago a car of our packing of Oldenburg went to Cincinnati, and since then we have been flooded with inquiries from them for more of them. There is no apple that will compare with it as a market apple except the Spy, and that does not come in competition with it. Is a better cooker than Wealthy, and better known.

It is hard to get farmers to properly pack apples, so we buy them on the trees as far as possible. They should be hand-picked and put in barrels. These should be filled full and the head fastened in so they will not bruise in taking to market.

Cold storage carries the Oldenburg along and makes it practically a winter apple, and they keep well in ice storage. Chemical storage is too expensive and ice is better. Have seen apples that were kept four years and were sound. The apples are taken from the cold storage room in small quantities, and sent to the grocer, who delivers them to his customers and they are used up before they show signs of decay. Pick apples when dry and pack in the orchard. Cold storage will not be necessary in Iowa for the next ten years. Apples are largely kept in damp, cool cellars. They must be kept damp to keep well. The grapes shipped to Iowa are largely kept in such cellars.

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A man in Kansas who had a brewery, turned it into a storage room for fruit when the prohibition law went into effect, and it was found to be better than cold storage, but, of course, would not keep the apples so long beyond their season.

Fruit taken out of any cold storage should be kept as cold as possible.

Cold storage houses should be built of stone below, and if above ground of double walls. Boards are used above, and a space of six inches left at the sides for cold air to pass down, and places provided for warm air to return. The ice is packed above, and no sawdust is used as the ice would not keep the air cool enough if covered. If we gave the proper care to packing and keeping grapes we could compete with the eastern growers.

Western New York, southwest Iowa, northwest Missouri, and eastern Kansas have orchards that are well cared for, but in the rest of the country there are twenty trees dying of age and neglect where one is planted and cared for. There is no danger of over-production of apples. I am trying to sell all the property I have to invest it in fruit growing, and I know of no place so good as northern Iowa. We have paid $200 per acre for the apples in an orchard of young Oldenburg trees, and that in a year of low prices. We give more for the apples and pack them ourselves than to have them packed by farmers.

I have seen fruit kept by the process used in keeping California fruit, and there is nothing harmful in the material used to preserve it.

J. W. SMITH: Salicylic acid, boracic acid and for exhibition purposes sulphurous acid is used for preserving fruit. The first is expensive. The second is less expensive, but I do not care to eat fruit kept by either. Bleaching by sulphur is also objectionable.

C. P. TRESCOTT: Mr. Patterson, of Kirksville, Mo., told me he knew the process known as the Hartzel process, and it was of no value.

H. W. ASH: We have a cold storage house at West Union. Apples put in during the hot days were badly damaged, while those put in in moderate weather were perfect. A charge of about fifteen cents per barrel is made for storing. It is ice storage and keeps at a temperature of forty degrees or lower. Crab apples put in storage brought $7.00 per barrel.

D. MCGREGOR: There is always a time between summer and fall or winter apples, when we have no apples, and cold storage will supply us at this time.

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THURSDAY MORNING.

D. A. Porterfield, delegate from Southeastern society, presented the subject of returning the southern tier of counties of the northeast district to the southeast district, and after a lengthy discussion it was referred to a committee, who are to represent this society in arranging the matter before the State society.

The president appointed as such committee the following:

C. G. Patten, S. W. Ferris, J. M. Elder.

The Committee on President's Address reported as follows:

We recommend that the society give the president a vote of thanks for his able and instructive address, and that he be allowed ten dollars to pay expense of stamps, etc.

S. W. FERRIS,
D. MCGREGOR,
EDWARD HOYT,
Committee.

The Committee on Treasurer's Report reported the following:

Your Committee on Treasurer's report have examined the books and vouchers of the treasurer, Mr. Edson Gaylord, and find the same correct.

E. M. SHERMAN,
CHARLES F. GARDNER,
B. F. FERRIS,
Committee.

On motion of C. G. Patten, Capt. C. L. Watrous was made an honorary member of the society, and the society then proceeded to the election of officers, with the following result:

President—W. A. Burnap, Mason City.
Vice-President—J. M. Elder, Concord.
Secretary—Elmer Reeves, Waverly.
Treasurer—Edson Gaylord, Nora Springs.

Mason City was chosen as the place of next meeting, to be held the third week of December, 1894.

Moved and carried that the treasurer be allowed the amount of his expenses in attending the meeting.

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The northeast district was divided into four districts, and a director of each elected as follows:

First district to consist of the counties of Allamakee, Winneshiek, Howard, Chickasaw, Bremer, Fayette and Clayton.

Second district to consist of the counties of Mitchell, Worth, Winnebago, Hancock, Cerro Gordo and Floyd.

Third district to consist of Butler, Franklin, Wright, Hamilton, Hardin, Grundy, Tama, Marshall and Story.

Fourth district to consist of Dubuque, Delaware, Buchanan, Black Hawk, Benton, Linn, Jones and Jackson.

DIRECTORS.

First Distr.ct—J. B. Mitchell, Cresco.
Second District—C. F. Gardner, Osage.
Third District—S. W. Ferris, Bristow.
Fourth District—C. H. True, Edgewood.

The duties of the directors will be to report at the next meeting the condition of trees, fruit crop and anything of general interest relating to horticulture.

On motion the matter of appointing delegates was left to the executive committee.

Moved by N. A. Reeves and carried that a vote of thanks be extended to Mr. M. H. Wetherbee for the elegant basket of flowers sent the society from his greenhouse.

The following was introduced by Capt. C. L. Watrous, and unanimously carried:

Resolved, That it is the sense of this society that the best interests of pomology will be served if Secretary Morton will promote the present Assistant Pomologist, Mr. Taylor, to be Chief of the Division of Pomology of the Department of Agriculture.

FRUIT LISTS.

BY ELMER REEVES, WAVERLY.

It has been the usual custom for horticultural societies to recommend a list of fruit, supposed to be adapted to a certain locality, and reliable as being the best known. Such lists are misleading and but little can be learned from them. The list is made up by a few men who are supposed to be posted on the behavior of the varieties in general cultivation, but it is hardly possible that any one man or committee of a few can know of all the failures and successes, and if they did they could not give the reasons for

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either. A person's actual knowledge of such things must come mostly by the results upon his own grounds and the grounds of others that come frequently under his observation. On my soil I may condemn a certain variety, while it will do well on half the farms in my neighborhood. As an instance of this: The Red Jacket strawberry is a failure on my grounds, while on farms not half a mile away it is one of the best. I would condemn it on account of leaf rust, while on my neighbor's wet soil it has a healthy leaf and does not rust, If I were making a fruit list I should not recommend that variety unless I had the opportunity to say that it should be planted on a moist soil. So it is with many varieties, excepting that we have not learned their peculiar wants, and if they fail on our own ground, we discourage planters from choosing them. Then, to, such lists give no comparison of the values of different varieties. A variety must be either placed upon the list as worthy of general planting, or discarded as not worth planting at all. A new sort that has apparently done well for a time is put on the list, while it may be of less value than many of the old sorts that are not mentioned.

A later plan for a fruit list was the one introduced by Hon. Geo. Van Houten, and is the one this society has followed for the past two years. Blanks are sent out asking each planter's opinion of all the varieties he has tested, and this includes the degree of value as compared with some variety recognized as standard. This plan cuts out no variety, but places before the enquirer a tabulated list, giving the judgment of a large number of growers as to the hardiness and general value of all tested varieties. This plan has its faults, but it is a question whether they can be remedied, except in the making of the list more extended and getting the opinion of a larger number of experienced growers. One fault this plan has is that it does not place the new varieties on an equal footing with the old ones. Fewer growers have tried the new sorts and cannot report on them, so the old sorts appear to be more popular, comparatively, than the new, while perhaps every one who has tried a certain variety, reports favorably on it. If a tabulated list could be made to show this point it would be of more value. The old list gave all an equal footing, and no differences in hardiness, productiveness or other points of difference were shown. The tabulated list endeavors to do away with these objections. It gives the varieties their proper value and leaves the planter to judge whether he wishes to plant a certain one or not. A great objection to such a fruit list is its cost. Blanks must be printed and sent out and postage sent for a return of blanks. This, in the aggregate, is expensive, and the expense is doubled by not more than one-half of those receiving blanks ever returning them, and many of those who do wait so long that their reply is too late for the list. To make a full list a large number of growers should be asked for results on their grounds, not only of the successful varieties, but also those that are failures, and, by thus giving results on all they had tested, a comparison could be had of the popularity of new sorts and not leave them at a disadvantage as compared with those more extensively tried. In our last year's list the Oldenburg was taken as the standard for apples, and all replies agreed as to its reliability. Wealthy appears to have been as fully tested and is placed as 1 or 2 in hardiness as compared with Oldenburg. Tetofsky and Whitney are about equally popular and marked 1 and 2, with more 1's than for

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Wealthy. Haas is marked from 1 to 3, Fameuse 2 and 3. Other varieties received less votes, but such new sorts as Hibernal and its class, also Patten's Greening and Charlamoff, are counted of first value by those who had tested them.

Of plums the question of hardiness does not enter into the consideration of our natives, and nearly all marked all varieties they had tried "1," but the list shows that De Soto has been more extensively planted than all others. It was first in the field, hence its popularity.

Early Richmond cherry was taken as the standard. Such a standard is not satisfactory, as we know the Early Richmond is not reliable, but it is the best known. Wragg and Ostheim are placed equal and, by some, better than Richmond.

Of grapes, Concord was the standard and Worden and Moore's Early received about the same number of votes, showing that we have a list of three grapes that are well tried and reliable. Niagara and the half-civilized Janesville, received each a good proportion of votes, while some of the better grapes appeared to be little known.

Snyder blackberry is the standard adopted by all growers, and but few mentioned any other except Ancient Briton.

In raspberries Gregg stands first, and Turner heads the list of reds. The vote shows that almost any of the raspberries do well, and a man's preference depends very much on what he has tried.

Crescent strawberry heads the list, and must still be considered the standby for all seasons and locations.

Other valuable points may be seen in the list, but for those I would refer the enquirer to our last year's report.

ANSWER TO QUESTION: The Crescent was placed at the head of the list, according to replies received from fifty growers. It succeeds everywhere. Lucretia Dewberry is successfully grown by covering well with straw in winter, mulching well with straw in spring, and allowing the vines to rest on the straw.

NATIVE TREES AND PLANTS.

BY E. M. SHERMAN, CHARLES CITY.

It is with a feeling of sadness that I note the ravages which development is making upon the flora of this section of our State. The time is not far distant, in fact, within the memory of many of our members, when northeastern Iowa was almost a trackless wilderness; and most of us can well remember the beauty of those vast prairies and mighty forests, each different from the other, and yet in its own particular way, lovely.

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Scarcely had the prairie lost its coat of winter's snow when we find peeping through the vegetation of the former season, the Pasque or Wind flower, with its tulip-shaped, lavender blossoms and silvery green leaves. This little messenger of good will to man is seldom seen to better advantage than in its native haunts, and yet we all love and admire it. Closely following this comes our blue and yellow violets, dotting the prairie in many places, and succeeding these come the shooting stars and phlox of many shades of color, literally painting the uplands and converting the prairies into a vast flower garden. At the same time or perhaps a little later, we find the Marsh marigolds and Lady slippers, or orchids of the moccasin type, dotting the sloughs and wet places. The latter were never common but to my notion they are among the most peculiar and at the same time the most lovely of our native plants, fully equaling and in some instances surpassing in beauty many of the foreign sorts over which our florists have gone wild. There is also another representative of this family found along the borders of wet lands which I think is well worthy of attention. It grows from eighteen to twenty-four inches high, and bears a single cluster of from four to ten blossoms arranged about the summit of its stem. The blossoms are creamy white with the lower or moccasin portion of the flower cut to shreds. It is fragrant and in this particular resembles the Candidum lily. It blossoms about the same time as our prairie lilies and are often found among them. These with lilies and several varieties of asters stay with us until Jack Frost drives them into hiding. Those of you who have sat in your saddles on a bright autumn day with no tree or human habitation in sight and seemingly nothing before you but the boundless prairie, its long grasses waving in the sun, have seen a sight which would baffle the brush of a Turner or the pen of a Thoreau. You have seen a sight which no living man will ever see again. I believe from that vision you can a little nearer realize what the poet meant when he said:

> "I love not man the less but nature more,
> For these our interviews, in which I steal
> From all I may be, or have been before,
> To mingle with the universe, and feel
> What I can ne'er express, yet cannot all conceal."

But these are gone! Civilization has stamped her foot upon our prairies and they are no more, but let us hope and labor to save from her ruthless tread at least some of the treasures which they contained.

Northeastern Iowa in the fifties contained some mighty forests, but they too, like the prairies, have become things of the past. These forests were composed mainly of white, green and black ash, red and white elm, white, red, pin, swamp, white, bur and perhaps a few other varieties of oak; shellbark and bitter hickory; hackberry, basswood, black walnut, butternut, black cherry, birch, ironwood; hard, soft and red maple, willow, poplar, Kentucky coffee tree, also fir, white pine and red cedar. These forests have been ruthlessly destroyed, and to-day it is impossible from what remains to get any adequate idea of the size of the specimens once growing among them, and it is with difficulty that one can find even specimens of trees which were once quite common, and some species are becoming almost extinct. But these mighty trees were not all that these mighty forests contained of value

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to us in horticulture. Among their shades were found bleeding hearts, blue bells, forget-me-nots, anemones, columbines, spring beauties, dog-tooth violets, many varieties of orchids, and also many beautiful ferns and brakes. Clinging about their hoary trunks or twining among their branches we find smilax, moon seed, clematis, ampelopsis and bittersweet. Here, too, we found many pretty shrubs and small trees such as thorn, bladdernut tree, cranberry, and the wild crab apple, all of which are becoming rapidly extinct by the steady march of civilization. We cannot stay its march nor do we wish to, but let us try earnestly to snatch from its ever broadening path these friends of our youth, these beautiful things which nature has spread broadcast for us in forest and in field. Let us hope, yes and pray also, that some philanthropic soul may resist that most deadly of all enemies to our friends, the greed of gold, and save for coming generations a few of the forests now left to us, and let those who admire the beautiful flowers of our forests and our prairies try and snatch a few moments of time from other vocations to become a little better acquainted with them, to gather them about our homes and thus preserve them from destruction.

In this paper I have not attempted to name all our native trees and flowers, or even all of those worthy of cultivation, but have simply mentioned a few which came to my mind, all of which I believe should be preserved. There are but few of these which will not transplant with ease, provided one will take the pains to study a little their native soils, habitats and environments. In this work of preservation all should help. The people of our towns and villages can do much, but those living in the country can do still more. There is also work here for all classes, the botanist, the curiosity seeker, and the landscape gardener, all have plenty of material, and if the scientist wishes a field for cross-fertilization or plant-breeding, I know of none more promising than our wild rose. But as a rule in towns we are too much hampered for room to do much in this line, and by far the greater part of this work except with flowering plants and a few street trees, must of necessity, be left to those living in the country. But to them dame Nature has most surely bequeathed a fortune, not only in space to work, but in materials with which to labor. If beauty of bud is desired, look to our hickories with their expanding scales. If beauty of coloring in expanding of foliage is wanted, turn to our birch and basswood for glossy green, and to our oaks for shades of rose. If autumn tints are wanted, try a combination of red, pin, and white oaks for shades of red; with hard maple, poplar, birch, ironwood, and ash for shades of brown and yellow, with hazel for undergrowth. Plant these properly and you will have an autumn scene to satisfy the most exacting taste. If in a damp, shady nook you want a low shrub, try bladdernut. If in an open lawn a low, compact, glossy leaved shrub with bright berries for a winter garb is wanted, try wahoo. The white pine is a pretty tree on a broad, open lawn. If on a damp, sandy bank you wish to see vegetation, what could be more lovely than a plantation of brakes and ferns? If a small, low house plant for table decoration is desired, try Maidenhair fern; it will please you I am sure and will be the envy of all who see it. No prettier twiner can be found than bittersweet, if an unsightly building is to be covered, but give a little time and Virginia creeper will do the work. If a small stump or other object in a sunny place needs a coat of green, the moon seed vine will cover it for you with a

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coat of large, glossy green leaves, and every one who sees it will want to steal that stump. Do you wish to plant a temple in whose shade the future generations may meet and worship? If so, plant an avenue of white elm. The present generation may use it for a driveway if they like. Do not make your driveway less than three rods wide, and plant a double row on either side, the rows not less than two rods apart, trees sixteen feet apart in the rows and after they have grown enough so that they crowd each other, cut out every other one. I said this temple was to be planted for the coming generations, and although it will soon become a beautiful lane, still it will take probably from fifty to seventy-five years before it will fully arch its roof, but when this is done you will indeed have something grand. England is proud of her Westminster, with its groined arches and gothic spires, and justly proud, but the beauty of Westminster will sink into insignificance in comparison with this double naved temple fresh from nature's hand. Who has ever seen a column of stone equal in beauty to the withy trunk of a mighty tree, or what Raphael has ever fashioned such an arch-way? What artist can ever equal the delicate coloring or tracery of that groined and vaulted roof as those myriads of twigs and leaflets sway and quiver in the breeze? "The groves were God's first temples," and surely they are far more beautiful than any of man's device.

In writing this paper I have had but one thing in view—to call the attention of my friends and neighbors to the fact they were spending their time trying to acclimate tender exotics, while strewn thick around them, even beneath their very feet, were things far more beautiful and useful, and that while they were engaged in this oftimes bootless task, the steady march of human affairs was placing forever beyond their reach the glorious heritage which nature has bequeathed to them.

HARDY FLOWERING PLANTS.

H. M. WETHERBEE, CHARLES CITY.

After accepting the subject for this paper, I found it a very broad one, and that I ought to write a book instead of a paper, so I decided to only select a few of what may be termed the best of the hardy plants for this and surrounding territory, by leaving out some of the hardier and most familiar plants, and perhaps some of those that are great favorites with those present.

It is a well known fact that the sales of hardy flowering plants have not been what they should have been during the past ten years. One reason is that the old fashioned door yards of our grandmothers, with the flowers and shrubs planted all the way from the house to the front gate, have been considered out of style, and not as good taste as a bed of coleus or geraniums

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planted out each spring on a well kept lawn. But people tire of one thing all the time, so fashion changes, and borders are considered the place to grow flowers at present. As everyone cannot have a border situated just like his neighbor, I will give an ideal situation for one that may be patterned after only as circumstances will admit. We will suppose a pleasant home situated on an east and west road, set back on the north side of the road, on a slight elevation, with room for a large lawn in front of the house. Just west of the house let there be a driveway and the eight feet on the west side of the driveway to be planted out as the border, planting the taller growing plants and shrubs to the back, and edging the driveway with low growing plants. It is well to leave plenty of room when planting, and fill in with a few annuals each spring, so that each plant will have room to make a perfect specimen as it becomes established with age.

Another reason why hardy plants have not become popular in the west is that eastern firms have sold the most of the plants in the west, either by catalogues or agents. If by catalogue, plants listed as perfectly hardy in the east prove of no value in the west; while orders taken by agents are usually delivered in the fall with directions to set out at once in permanent place. The results we all know—that few hardy flowers will stand transplanting in tne fall and be in good growing condition the next spring; our climatic changes are too great.

Bulbs, as a class of flowering plants, usually give the best of satisfaction with only a small amount of care. Perhaps there are but few bulbs that deserve more popularity than the tulip. There are large quantities of the tulip bulbs imported annually, the most of which come from Holland, but it has been demonstrated that we can raise as good bulbs in the United States as anywhere, if we will only take the trouble to do so. The usual plan of planting these is to get the beds ready during the fall season, and plant any time before the ground freezes up. To get the best effect the bulbs should be planted four inches each way, and from four to six inches deep, in any good, well drained soil. As to the varieties and colors, one will have quite a range to select from, and if you wish to pattern after the city parks you will plant in masses or clumps of a solid color, or two or more colors that contrast well together may be used to good effect in a bed. After the ground has become frozen it is better to put a light mulching over the beds, but as soon as the ground thaws out in the spring, it should be removed, or one is liable to injure the flower stalk after the tulip is up. As soon as the bed is through flowering it is best to take up the bulbs and set away in a dry, cool place until fall planting time.

As to lilies, there is quite a variety that flourish with a little extra care. One of the hardiest of the white is *L. candidum*, or hardy Easter lily, that flowers during the latter part of June. Candidum bulbs should be planted in September, or early enough so there can be a good crown of foliage formed before cold weather sets in. For winter, there should be a light protection of leaves or straw placed around the crown of leaves, which will remain green during the winter. This bulb was formerly forced for winter flowers, but the Bermuda bulbs, mostly Harrisi, but some Longiflorum, have superseded it on account of the greater ease with which they are forced. The Japan lilies are a class that is quite well known. The *Auratum* stands at the head in regard to size and fragrance, but cannot be relied on

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to be hardy in all situations in this climate. But the variety called *rubrum*, or *roseum*, seems to be perfectly at home here, so that the bulbs increase in size and produce new bulbs at a rapid rate, even under adverse circumstances of culture.

While we are talking of lilies, we must not forget to mention the Lemon lily, that flowers so freely in the spring.

Of the Lily of the Valley we should have a large sized bed, keeping the soil well fertilized and watered if the spring months are dry. The beds should be reset once in three years. It is not known by many that Lily of the Valley pips have to be frozen before starting growth to flower well. That is the reason that we can buy Valley flowers any month of the year, as the pips are packed in sand or other damp substance and placed in cold storage houses, where they are kept until from two to four weeks before the flowers are wanted, when the pips are planted in a warm greenhouse and the flowers come out in all their beauty and fragrance.

Funkia, or Day lily as it is commonly called, both the blue and white are perfectly hardy here, and should be planted for their fragrance, if nothing more, as the plants flower for a long time during August and September, and are usually flowering when frost comes, a time when most of the hardy plants are through flowering.

Among the plants of recent introduction that are bound to become popular, are the Japanese, or Kaempferi Iris; they have been called the poor man's orchids, and certainly the richness of colors, with the delicacy of blending, make these lovely flowers a wonderful study for the artist. The plants are easily propagated by division in the spring, and will do best in rather wet soil. The flowering season is June and July.

Another plant that has not become common is the Hardy Hibiscus that flowers during a good share of the season. It blooms the second year from seed, which is the best way to get up a stock of it; also of *platycodon grandiflora*, with its shades of blue and white flowers. Only the platycodon will flower well the first season if the seed is sown early,

Achillea Ptarmica has been grown where a constantly-blooming white flower is wanted; but Achillea, the Pearl, is a great improvement on the older variety, and can be recommended as a good plant for cemetery planting, as it requires so little care to keep it always looking well.

Columbines, Sweet Williams and Hollyhocks are old-fashioned flowers that are becoming popular again with the great improvement in varieties and colors. They all flower the second year from seed, but hollyhocks should have a fresh supply of seed sown every summer, but not too early, as the large plants do not seem to winter well, but every small plant that winters over will make a good stalk of flowers if given a chance; some of the large double ones are fine.

Clumps of perennial phlox are admired when good colors are selected, and as there is quite a list to select from, they should be more planted where space is not wanting.

Of all the flowering vines that have sold at a high price and will probably continue to bring good prices on account of the difficulty of propagation, the best is the clematis. While all are rather pretty, none seem to give the satisfaction of the large flowering class of which Jackmanni is the type that is called for. Good strong roots bring good prices; the plants seem to do well in almost any situation where well trellised up.

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The old fashioned scarlet, also the white or Halleana honeysuckles, always seem to do well with but little care, and to have a few of their odd flowers.

In the hardy flowering list of shrubs we might mention the Tartarian honeysuckle, syringas or mock-orange and spiræas.

One of the best of flowering shrubs that can be planted in almost any situation is *Hydrangea paniculata grandiflora*. This shrub flowers during August and September when white flowers are none too plenty, so it is used by the city florists as a staple cut flower during its season. To have the bushes produce the largest flowers, the plants should be well pruned back in the spring before growth starts.

Among the long list of hardy roses catalogued, there are but a few that are successfully grown in our climate. The Prairie Queen is the hardiest of the climbing rose bushes; while Baltimore Belle can be raised if well protected during the winter months, and it pays to do so, as it is a profuse bloomer in its season.

Among the hardy roses we have two Japanese varieties that continue in flower all summer, and for that reason should be largely planted, although the flowers are single, which gives them little substance. The varieties are *Rosa rugosa alba* and *Rosa rugosa rubra*.

Among white roses, Madame Plantier is the best that will stand our winters, but it never flowers except in the season of roses.

Perhaps Gen. Jacqueminot is sold more than all other hybrid perpetual varieties combined for severe climates. While it is far from being the finest of the roses, it has usually done well with moderate care, and then it received a great name by being one of the first hybrid roses that could be successfully forced for winter flowers, but it is now mostly superseded by hybrid tea roses in the cut-flower market. The most beautiful of the pink hybrid perpetuals that I have seen is the comparatively new variety, Mrs. John Laing. This rose seems to combine so many good qualities that it nearly reaches perfection. Magna Charta, a hybrid China, is considered one of the best, while Paul Neyron and Madame Chas. Wood follow along in the list as roses we can successfully grow, although all need some protection during winter. The best way I have found in handling a few bushes is to draw the bushes as near the ground as possible, and cover with soil, which should be done about the time for the ground to freeze up for the winter. Before the snow falls to any depth there should be a good covering of straw or other rubbish thrown over the bushes and ground near them to keep from thawing and freezing during the sudden changes of winter and spring months. Do not be in a hurry to uncover the bushes the first warm day in spring, as sudden freezing is dangerous.

The committee on premiums report the following awards:

Edson Gaylord, collection of apples from one county	$ 5.00
Edson Gaylord, best plate Wealthy	.50
C. H. Griffith, collection grown by exhibitor	5.00
C. H. Griffith, best seedling, second premium	1.00
C. H. Griffith, best plate	.25
C. F. Thorpe, best seedling	2.00

N. A. Reeves,
C. P. Trescott,
P. F. Kinne,
Committee.

Report adopted.

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Moved by Capt. Watrous that the secretary of this society be authorized to become a member of the American Pomological Society in order to obtain their report. Motion carried.

SOME ILL EFFECTS OF TREES.

BY DR. JOEL. W. SMITH, CHARLES CITY.

Upon the sanitary effect of trees in cities and villages much has been said and written, yet the subject is not generally well understood. Trees are beautiful and in the proper place useful or ornamental. These thoughts so pervade the minds of most adults as to often lead to the planting of too many trees, or allowing too many large ones within narrow limits; the result being to prevent the free circulation of air and increase dampness, to the injury of the health of the people. Such cases are so common and self evident as to require no further proof. Cowper wrote, "God made the country and man the town."

If dampness and impure air do not cause disease *de novo*, they are known to greatly aggravate many of the more common and fatal diseases. While we must not charge too much to such agencies, the wise sanitarian will find much to attribute to these causes. A dwelling that is almost embowered with the tops of trees, or only thickly surrounded by trees, is of necessity a damp house; its contents often show mould or fungus, even if it is daily carefully removed. If there is a close and low cellar, that will increase the dampness. The circulation of the outer air will be injuriously obstructed, and thus two of the most common factors of disease—dampness and impure air—are furnished in abundance, if not to order, for the inmates of such a house.

And to go a little further, when the health of the inmates of such a residence begins to fail gradually, and the physician is called, what is the common course of most medical practitioners? Is it to investigate and direct the removal of the prime causes of such impaired health, if possible, or to write a prescription for drugs from the nearest pharmacist? By which course would the patient be most likely to recover? And by which course would the doctor, pharmacist, nurse and undertaker make the most money? Such considerations must arise as the direct result of only a small amount of reasoning as to cause and effect.

Many small or fewer large trees often render streets damp and muddy and buildings too dark for the best health of the occupants. Want of light, especially sunlight, adds a third and potent factor of disease and impaired eyesight. The three factors now named, dampness, impure air, and want of light, strongly predispose to consumption, rheumatism, diphtheria and some other diseases, and if continued, will lead to delicate and unhealthy

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countenances, feeble infants, each generation growing more so, and in a few generations nature kindly allows the family to become extinct in the race for "the survival of the fittest," or strongest.

Physicians in the largest cities will not often find too many trees, except occasionally in the suburbs. Hence this subject—effects of trees—naturally falls more within the range of those observers in villages and the smaller cities. Many isolated country houses are so embowered with trees as to be dangerous. No physician of experience can have failed to be called to such places.

How can the evil of too many trees too close to dwellings be corrected, especially in cities and villages? This association can do much to enlighten the public, and especially the inmates of buildings that are dangerous from the three prime causes of disease named. The germs of most diseases are weakened and some destroyed by sunlight and dry, pure air. Holding public health institutes in the several counties will be productive of much good. Boards of health and other sanitary authorities, it is hoped, in the near future will have power to abate all well understood causes of ill health and disease. That is the good time for which we should all patiently labor and hopefully wait.

REPORT OF DELEGATE TO WISCONSIN.

BY W. A. BURNAP, MASON CITY.

As your delegate to the winter meeting of the Horticultural Society of Wisconsin in February, 1893, I desire first and foremost to report the hearty, cordial and fraternal welcome which that organization gave me as your representative. Notwithstanding I made an animated and aggressive interrogation point of myself, they always treated me with utmost courtesy, answered the many questions that displayed my deep ignorance with the utmost good nature, and at all times rendered me every assistance possible to enable me to ascertain what they were doing in an horticultural line.

The first thing that attracted my attention was the great diversity of conditions favorable to horticultural success that exists in Wisconsin. We in Iowa have many such variations entirely independent of the question of latitude and isothermal lines, but their variation far exceeds our own. J. Zettel, who secured the first premium for best collection of World's Fair apples in 1892, lives fully one hundred and fifty miles north of where we meet to-day, and the list he furnished reads like a Missouri collection.

Allen's Russet, Antonovka, Bailey Sweet, Bellflower, Ben Davis, Blue Pearmain, Bogdanoff, Crocker, Fameuse, Flushing Spitzenberg, Golden Russet, Jonathan, Longfield, May Seek-no-further, McIntosh Red, Perry Russet, Red Romanite, Scalloped Gilliflower, Scott's Winter, Tallman Sweet, Utter, Wolf River, and Pewaukee, and these apples were not raised in specimen lots. J. C. Plumb asked

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a young German from up that way if he knew Zettel, and if he grew many apples. "Why, yes," he said, "he loaded a sloop with them this year and sent them to Chicago."

Upon my first opportunity I procured a map to locate Zettel, and found him on a peninsula between Green Bay and Lake Michigan, and I could then begin to understand the phenomenon. I could also understand why they are making a success of orcharding away up on the shores of Lake Superior, but what I could not understand was why Barnes and Springer about Waupaca county fifty miles west of Green Bay and away from its influence, should report nearly similar results and raise fruits that are not hardy in the southern part of the State. Wisconsin men seemed equally at a loss, for I was totally unable to find any person who could enlighten me on the subject. The only reply I could get to my diligent inquiries was, "Oh, those fellows are up in the banana belt," and that closed all debate and settled in the negative the question of their experience being any guide or encouragement for southern Wisconsin or northern Iowa.

Outside the "Banana Belt" just mentioned, the experience of our Wisconsin friends is much like our own, and their debates and suggestions and hopes and disappointments are all at least first cousins to ours.

For the five hardiest varieties for cultivation their society recommend Oldenburg, McMahan, Hibernal, Wealthy and Tetofsky. If compelled to add five more o the list, they would be Fameuse, Tallman Sweet, Wolf River, Yellow Transparent, Longfield and Newell.

I think there is nothing for us to learn in the apple list unless it be to give McMahan a more thorough trial. I heard nothing but good words for it from all parts of Wisconsin.

Their pear list is boiled down in these words: "Most likely to succeed, Flemish Beauty."

For plums: "Although in the 'Banana Belt' they raise Lombard, Green Gage, etc., the only one recommended for general cultivation is De Soto."

Small fruits are endorsed much the same as with us, with the exception that Moore's Early grape, Ancient Briton blackberry, Nemaha, Ohio and Cuthbert raspberries are pushed further to the front than usually permitted in our society.

An animated discussion arose over the proposition of J. C. Plumb, "hardiness of an apple was always at the expense of quality;" *i. e.*, that a very hardy apple must necessarily be very poor in quality.

Prof. Goff, in a very carefully prepared paper, seemed to demonstrate from examination of several hundred varieties, that if there was any law upon the subject, that exactly the reverse was true; but J. C. Plumb refused to be convinced, and the war still goes merrily on upon that line.

The Russian and seedling question is fully alive in Wisconsin, as with us, and I believe a like conclusion has been reached by a majority of both societies, that among the many varieties presented in the Russian and new seedling lists there are many in *each* that will prove of value, but "which ones are they?" That's the difficulty. While seedlings were very numerous in Wisconsin, I found none pushed prominently to the front with any respectable backing, and I am strongly impressed that they have nothing in that line that will equal our own Patten's Greening.

I had the pleasure of hearing A. C. Tuttle, of Baraboo, upon the Russian question. He took the witness stand to correct a report made over his name, that the "Russians were not as hardy as Oldenburg." He claimed that many were as hardy, but admitted the difficulty of selecting from the hundreds he had fruited a

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list that he would confidently recommend for general cultivation. Upon being requested by your representative to name six that he considered the best, he promptly named Longfield and Antonovka, and then seemed disposed to stop in doubt; but being urged to complete the list, added Cross, Lieby or Hibernal, and Yellow Transparent.

The conviction was here forced upon the mind of your delegate that when a veteran Russian apple man like Tuttle hesitates in naming a list of that fruit for general cultivation, it is only common prudence to make haste slowly in that direction.

In closing this rambling paper, I wish to call your attention to the close bond of horticultural union that unites southern Wisconsin, southeastern Minnesota and northeastern Iowa together in community of interest and conditions, and to urge the necessity of mutual aid, encouragement and assistance on our mutual way to the horticultural success that is surely coming, and if anything in this paper will help the good cause along, the wish of your delegate is accomplished.

DISCUSSION.

C. G. Patten spoke of the need of a more thorough organization of the society and the benefit of examining the methods of other societies and adopting whatever is found of advantage; also urged the need of a larger appropriation from the State society.

THURSDAY AFTERNOON.

The following valuable letter was handed the secretary by Mr. Patten, and by vote of the society the writer, Mr. Clarence Wedge, of Albert Lea, Minnesota, was made an honorary member of the society.

ALBERT LEA, Minn., Dec. 18, 1893.

FRIEND PATTEN: Your cordial letter of invitation duly received and read before our society. There may be some of us to respond and be present at your meeting this week, but you know the times are not favorable to much moving about. As for myself I concluded to take the time that I had thought of spending at Charles City in making an inspection of the experimental tree station at Owatonna. As you may already know, the local conditions about that point appear to be peculiarly trying. The old orchards show the Oldenburg as living wrecks; the Tetofsky standing only as heroic specimens here and there, and the Wealthy, out of a planting of a thousand trees, only as scrubby sprouts, blighting severely and never profitable. The past winter killed back yearling trees nearly to the ground, and very few nursery or orchard trees started from the terminal bud the past spring.

In such a situation, and under the charge of such a methodical, painstaking man, it seems to me that the station should prove of great value to us of Minnesota, and perhaps almost as useful to you of north Iowa, who have so much more at stake in orcharding. We spent two whole days wading about in the station orchard

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and nursery, where in all there are about 500 grafted varieties on trial. Blight has been very severe in all parts of the ground, and has killed many trees that are liable to its attack. Among the few that grew from the terminal this spring, I observed the Hibernal, Yellow Sweet (No. 167), Tonka, Martha and Virginia crabs, Dartt's Hybrid, and a few other station seedlings. We neglected to take *exact* notice of the Oldenburg, but all of that family were doing well in the orchard. The Anisim and Patten's Greening did not show blight, but were not quite as good at the terminal as those in the list above. The Lubsk Queen (No. 444), did not show up as good as could be desired. The Yellow Sweet (No. 167) appears to be an extra tree everywhere; at my own place it is free from blight and the very ripest hardiest tree that could be desired. The Hibernal stands out at the station, as it does everywhere I have seen it, as a thoroughly trustworthy variety. The White Spruce and *Picea pungens* and Dwarf Mountain pine were there in all their glory, but the Douglass Spruce did not look so well in open exposure; on the north side of a shelter it was doing well.

At the meeting of our Southern Minnesota Horticultural Society, it may interest you to know that the following fruit list was adopted:

For general planting: Oldenburg, Hibernal.

For general trial, and to be planted in limited quantities: Borovinka, Charlamoff, Christmas, Good Peasant, Anisette, Blushed Calville, Anisim, Patten's Greening, Longfield, Wealthy.

Crabs for general planting: Martha, Early Strawberry, Virginia, Whitney Briar's Sweet, Tonka.

For trial: Greenwood, Pride of Minneapolis. Dartt's Hybrid.

Grapes: Moore's Early, Early Victor, Worden, Brighton, Delaware.

Plums: De Soto, Forest Garden, Weaver, Rollingstone; for trial: Ocheeda, Wolf, Cheney, Gaylord, Rockford.

Wishing always to be considered one of your society, I enclose membership fee.

Yours cordially,

CLARENCE WEDGE.

REPORT OF DELEGATE TO MINNESOTA.

BY E. CONNOR, HUMBOLDT.

Upon reaching Minneapolis, in January, 1893, I found the Horticultural, Forestry, and Bee-keepers' societies on the seventh floor of the Lumber Exchange building, and it is needless to say that I found a very earnest and enthusiastic body of men and women.

Your delegate was not a little surprised to know that there were so many apples raised in Minnesota, Mr. Keel, of Rochester, alone having raised, in 1892, 3,500 bushels, principally of Oldenburg and Wealthy; for the former he received $3.00 per barrel and $4.00 for the latter in the orchard.

There were 168 plates of apples and crabs on exhibition, many of them seedlings of promise.

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I find many friends of the Wealthy, and after hearing the many good reports from some of the old "wheel-horses," such as Mr. Somerville and others, I came away more a friend than ever, if possible, to the Wealthy. While Hibernal, or Lieby, is highly praised as to hardiness of tree, the fruit is thought to be inferior to that of Wealthy and not as good a keeper.

Fire-blight and sun-scald seems much worse than with us in northern Iowa, but few of the Russians withstanding the blight. Hibernal seems to be the only variety that is free from this. There were many good words for Melinda, the only objection being its slow coming into bearing as a root-graft. The Minnesota people have much hopes of the seedling apple, and already think they have several of promise. Mr. O. F. Brand has one he calls the Peerless, a cross between the Oldenburg and Tallman Sweet. Patten's Greening in every instance where it has been tested is highly spoken of. Although there are many good things looked for in the new varieties, the best fruit growers, such as Mr. Keel, Mr. Somerville and others who are raising apples for the market, do not think they would be willing to discard the Oldenburg and Wealthy for anything that has yet been produced for commercial purposes. These men are raising apples for the money that is in it, and are getting good crops and good prices. The proof of the pudding is the eating thereof. Deep setting of apple trees was thought by many to be beneficial. Mr. Somerville stated that he had set as deep as three feet and had good results. Trees bore much heavier crops and of better quality than those set in the ordinary way.

Boxing trees has been practiced by many during winter to prevent thawing and freezing, and by some thought to be beneficial. Mr. Somerville thinks that there are more trees starved to death than are winter-killed. I believe this to be true for I find the orchards that have been planted on high, gravelly knolls are nearly all dead, and those that are alive have made but feeble growth and have not vitality enough to produce fruit.

For plums the De Soto leads the list; for trial the Ocheeda and Rockford. The De Soto seems to have many friends wherever found; in fact, I believe it is the plum for the people of northern Iowa and southern Minnesota.

There were over thirty-four plates of grapes on exhibition and of very fine quality. This fruit is extensively raised around Lake Minnetonka which seems especially adapted to grape growing. The varieties that seem the most popular are Concord, Worden, Delaware, Lady and Martha, while Moore's Early was thought good by some, but by many a shy bearer and shells badly. Mildew seems to be more prevalent than with us.

Some very interesting remarks were made on Forestry. Mr. B. E. Fernow, Chief of the Forestry Division, Washington, D. C., gave a very able address showing the condition of our forests, and urging that some action be taken to protect our pineries from destruction by fire.

The papers on evergreens brought out no little discussion, and upon the whole the Scotch pine was thought to be the tree for wind-break, and for all conditions of soil and climate.

The election of officers resulted in the selecting of old officers. In conclusion I would say that it will always be in the fondest remembrance that I shall hold the members of the Minnesota Horticultural Society and the people of Minneapolis for the cordial greeting and kind reception.

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DISCUSSION.

MR. HILL: Do you advise deep planting of trees as recommended in the report?

C. G. PATTEN: I have tried deep planting and do not think it advisable, although it will sometimes prove successful, but not more so than planting the ordinary depth.

E. GAYLORD: I believe deep setting is a question of importance, and, although three feet is too deep, they should be little deeper than they grew in the nursery.

FALL PLANTING.

BY CHARLES F. GARDNER, OSAGE.

This is a very important subject, and requires careful study and examination in order to arrive at correct conclusions. It is quite apparent, however, from past experience, that fall planting in this latitude is not to be recommended in a loose general way, but all statements with regard to it should be accompanied by an explanation of facts which come under the eye of the observant planter. There is nothing wanting to make fall planting a success, except that there is a good deal of extra labor involved, and in many instances it will not pay. When I say success, I mean that trees and plants can be set out in the fall and live through the winter, and make a fine healthy growth the next season. To arrive at satisfactory results, there must be nothing undone or omitted regardless of time or expense.

What are the requirements for fall planting? If it is essential for spring planting, to have strong, healthy plants, with good roots, that have not been exposed to the action of a dry atmosphere, it is doubly so for autumn planting.

We set apple trees leaning at an angle of forty-five degrees to the southwest. After setting, they should be banked up with earth to the height of eighteen inches; over this, and around each tree for a space of five or six feet, should be placed a coat of horse manure four inches deep. This will keep the ground from freezing until intense cold weather comes on, and then it will keep it frozen until after spring opens.

All deciduous trees should be pruned by cutting back at least a third part of the present season's growth, covering the cuts with grafting wax.

In my opinion it is highly important to have the ground well pulverized and in the best condition possible to ensure success in autumn planting. All rubbish should be carefully removed. Absolute failure will result if the roots are not properly firmed (packed).

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Apple trees set by us in the fall of 1892 made a far better growth the past season than those set last spring. We can show, also, thousands of evergreens planted in the fall, that are as healthy and perfect as those set in the spring. We never have the earth shaken off from the roots of trees that are to be planted in the fall; we get all the roots we can and all the earth that will hang on. We set them out in well prepared ground, roots well firmed, bank up with earth, and mulch with horse manure.

Evergreen roots must not be exposed in summer or fall planting. Right here is where the vital principle comes in, not only at the times I have mentioned, but also in the spring, ninety-nine times out of a hundred the cause of failure in the planting of evergreens, is caused by *exposure of the roots*, whether they are planted in the fall, spring or summer.

To digress a little from my subject, I will say, that so far as planting evergreens is concerned, at any time of the year when the ground is in good condition where they are to be planted, it depends for perfect success, on the manner of digging the trees in the first place, and second, in the way the roots are protected in transit, and third and last, in the way they are planted. If these three things are well done the result will be success, whether in April, May, June, September or October. The general cause of failures is lack of protection for the roots, and as far as the time of the year is concerned I think that has but very little to do with it.

People who will not carefully protect evergreen roots from *all exposure* need not bother their heads about either fall or spring planting, as at either time it will result in disaster.

But to return to my subject; we have heard it stated that strawberry plants ought not to be set out in the autumn. This is partly true and partly incorrect. For commercial planting there is no doubt but that spring is the best time, and in fact it is generally agreed that for most people spring is preferable to fall planting.

Strawberries can, however, be set in the fall at any time with perfect safety so as to come out in the spring nice stocky plants, if they are properly set and taken care of. Plants set late in the fall should be mulched with horse manure as soon as set. Cover the ground all over three or four inches deep, except right where the plants are, leave the plants just so you can see them, then when it comes on quite cold weather cover the plants lightly with clean prairie hay. The roots of a strawberry will continue growing as long as the ground is not frozen.

In setting strawberry plants in the fall I use no plants but those that are large and healthy and have white roots, and we leave all the earth on that will adhere to the roots.

In increasing a stock of some choice variety I generally replant in the fall. If set early in the autumn, and the weather is dry, I keep the cultivator running, going over the patch at least twice a week, and mulch about the time that heavy frost begins.

Currants and gooseberries always do better when planted in the fall. I always cover our beds of cuttings with a coat of fine manure two or three inches deep. Cuttings of the former planted the last of August or the first of September, will develop roots five or six inches in length before winter sets in. All plants set out in the autumn must have a winter protection, and the mulch as described is generally sufficient. Where many people

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fail in both spring and fall planting is in neglecting to properly prepare the ground before setting, and failing to start the cultivator in season. All cultivating should be done at such times as to the eyes of a careless observer it would seem that the plants did not need cultivating. They should be gone over twice a week in the growing season and once a week will do later in the season, unless the plants are suffering for the want of water; if such be the case, keep the cultivator going as much as possible. Use such tools as will keep the ground level. Farmers generally destroy strawberries and other small plants they set out by using too large cutting shovels, as double shovel plows, such as are in common use on farms. They should never be used. Cultivators with fine teeth and set to run shallow should be relied on exclusively. Raspberries and blackberries set in the fall should be cut back to three or four inches and the whole plant covered with earth and then mulched as you would for strawberries. All seeds planted in the fall should be mulched or they will lay on the top of the ground in the spring. The mulch must be removed before the growing season opens.

I have heard it stated by men who are supposed to be brilliant lights in horticulture, that it is necessary in order to get a good stand of strawberry plants, to have a rain immediately after you get through planting. While I admit that a rain at that time will do them good, we know in practice that we cannot depend on having rain just when we want it, and a person that sets out plants in such a way that they depend entirely for their success on whether it rains or not, shows that such men do not know how to set plants. Cultivation should commence as soon as the plants are set, in spring planting, also in early fall planting, and the man who has his plants set so that the cultivation is liable to loosen them had better take a lesson in the art of transplanting from some first-class, successful fruit grower, like Isaac Clayson, of Osage, Iowa, who has forty acres of small fruits under the highest state of cultivation.

All trees and plants that cannot be set in the fall and receive the attention described, had better be left for spring planting. The careless man and the man that cannot tell one tree from another, had better defer planting until spring and perhaps longer.

With regard to directions, throwing up a mound around a tree, eighteen inches in height, the tree is supposed to be three or four feet high. Larger trees should have larger mounds, and the earth to make the mound should not be taken within five or six feet of the tree. Late in the spring the mound should be leveled. All trees that are dug, packed and shipped long distances should not be planted out in the fall, but should be held in for spring planting. I do not recommend shipping evergreens to be set in the autumn. If you cannot get them near home, ship and plant in the spring.

DISCUSSION.

J. M. ELDER: If I get good sound trees I do not expect to lose any. Do not know of any reason why trees should stand any deeper in the ground than they grew so I set them two inches deeper and when the ground settles they are the same depth. I do not believe you will get any more strawberries by setting in the fall than in the spring, and you have the extra trouble of caring for them through the

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winter, and you will usually lose two-thirds or more of your plants. Fifteen minutes exposure of the roots will kill an evergreen.

C. F. GARDNER: Mr. Elder has made a great mistake in his statement that fifteen minutes will often kill an evergreen, and it should be impressed on every planter. One minute will usually do the job. As to fall planting it is a gain to do all the work you can in the fall. I set a lot of choice strawberry plants this fall but did the work myself, and if I had to hire it done I would stand over the men to see that it was not slighted. Last spring I had three Columbus gooseberries sent me for trial and they looked so promising that I propagated them as rapidly as possible and now I have fifty good plants. For commercial planting and for farmers I would not advise fall planting of the strawberry. Nearly all farmers will lose their plants if they try it.

N. A. REEVES: I can set strawberry plants any time of year with success, but we must do all work with the idea of the greatest results from the least labor, and spring planting is therefore best. All plants are protected by their roots being in the ground and so kept moist, and if exposed to the air there is danger of losing them. A fish out of water is in danger of dying, but there is a great difference in them. A trout will die very quickly, and in this he may be compared to the Hemlock, which is perhaps, the most sensitive of the evergreens to exposure. On the other extreme is the carp which will live a long time out of water, and so it is with some kinds of trees, but it should be remembered that they are in danger of dying, and if they do not die they are not benefited, but are injured and weakened by exposure. Keep the roots of plants from exposure, and especially evergreens and all plants of a resinous nature, as if once dried they are lost. Mr. Gardner has a special plan and reasons for fall planting and is all right but a farmer is not so situated. If I set one hundred strawberry plants in the spring I should get at least one hundred quarts of berries from them the next year, and I often get more than that.

C. G. PATTEN: There is not one man in fifty who will succeed with fall planting. It is entirely erroneous to recommend it for any of this northwest country. Our climate is so dry and intensely cold that it is only an occasional year that it will succeed. If the practice of fall planting is adopted it can only result in failure.

QUESTION: Will the Wilson strawberry succeed here as it does in New York?

C. P. TRESCOTT: They will do well if planted here, but would not set a bed of them alone as they do not produce fruit enough. Warfield will produce ten quarts to their one, and they are so much alike that they can be picked together.

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QUESTION: Will river bottom land that is very warm and rich and shut off from the breezes to a great extent, be a suitable place for strawberries, currants, etc.

C. P. TRESCOTT: You can raise a crop of fruit anywhere, and I should accommodate myself to circumstances and surroundings. Would not consider the place described as the best location, but a good crop could be grown.

J. M. ELDER: The best crop of berries I ever saw were Crescents fertilized with Capt. Jack, but you can not take advice from any one in this matter. You should get all the experience of others you can, and then find out for yourself what will do best on your grounds.

C. G. PATTEN: With me the Capt. Jack is a poor plant and a weak fertilizer as the blossom is poor.

MR. HILL: I want to learn just what a good tree is and what a good root is. Am not posted on such matters, but came here to learn and want some one who is posted to tell me, as I want to be able to judge if I get good trees.

E. REEVES: That is something no one can tell you any more than you can tell me how to select a lot of good steers and feed them so I shall get the top price in market. It is something that you must learn for yourself by experience and observation.

C. G. PATTEN: Trees differ very much in their roots. If you ordered Scotch pine and spruce you might be satisfied with the roots of the spruce while you would not consider the pine worth planting if you did not know the nature of each tree. Some trees have much more root than others and experience alone will guide you in judging of this.

Elmer Reeves read his report as delegate to the Northwestern Society. The proceedings of this society are published in full in this volume.

DISCUSSION.

C. H. TRUE: I would like to hear about the Communial plum.

C. G. PATTEN: It is hardy and valuable from the Illinois Central road south, but tender north of that. It is fine grained and sweeter than Lombard. Brusseler Braune and Bessarabian cherries are not reliable north of the Illinois Central. Whoever will plant seeds of a crop of these cherries raised in the north will do a great service to the country. If we are ever to have cherries in north Iowa we must originate them here. About all the Russians injured here last year.

J. M. ELDER: I had a lot of these Russian cherries and can not recommend any of them. Some are thrifty and look well but do not bear. Early Richmond has given us about all the fruit we have had.

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STRAWBERRY CULTURE.

BY G. A. IVINS, IOWA FALLS.

The strawberry is the most important of all small fruits, and the most neglected by many. The past two seasons the demand for choice berries has been far greater than the supply, and at such prices that all fruit men can well afford to make a greater effort to grow fine fruit. I do not know of any crop of small fruit that pays any better than strawberries when properly grown and *nicely picked* for the market. Every fruit grower knows that the whole mass of people want strawberries more than any other small fruits, and the ever-increasing demand, year after year, will give the grower a fair profit for his labor and investment. In planting strawberries for field cultivation, never plow your ground until you are ready to plant; do the plowing as early in the spring as the weather will permit; then drag it thoroughly; after this go over the ground with the roller. In marking out the rows, have them four feet apart. This will give a better opportunity for cultivating the latter part of the season. The distance you should set the plants apart will vary, for some varieties will make more plants than others. As a rule, from fifteen to twenty-four inches apart will make a nice matted row. Take the plants and trim off the long ends of the roots, so they are about four or five inches long; then put them in water and keep wet while planting. To make the work easy, and to set the plants well, get a potato hook that has four flat straight tines (not curved) and a straight shank. Now strike the hook in the ground, then pull it towards you a few inches, take the plant and spread the roots fan shape, then place it in the ground so that the crown of the plant is level with the surface of the ground, holding it there until you raise the hook up, then catch the ground in front of the plant and press the dirt back against it. This is done in a few seconds and is much better than if planted with a spade, or any other method I have ever seen. In planting the pistillate varieties I have had the best results by planting them every other row with the staminates. To have a good stand of strawberries it is necessary to go over the bed and fill in where the plants have died. A poor stand of strawberries is like a poor stand of corn. It does not pay to cultivate the ground for a part of a crop. The more frequently you cultivate and hoe your strawberries the easier the weeds are killed, and the larger crop of berries you will have. All my hoeing is done with a potato hook. I have no use for a hoe on my place, unless the weeds have grown so large that I can not use the hook to good advantage. Cover the strawberry beds after the ground has frozen hard enough to hold up a

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team. I prefer covering with manure when prairie hay has been fed. This makes the best covering I have ever used. In the spring go over the rows and loosen it up, and where it is too thick spread it out between the rows, but never leave the ground in the rows bare. The plants will come up through the manure, providing the covering is not too thick.

Experience has taught me that men and women do the picking far better than boys and girls; they generally do poor work, which is always a detriment to your best interest. Keep up the standard of the No. 1 berries; when this can not be done, it is better to make a No. 2 grade and sell for less money. The prevailing idea that the large berries *must sell the small ones*, is a poor business maxium upon which to build up a future trade. To renew a strawberry bed for a second crop, mow the bed close to the ground, rake it clean and haul off the vines; then take a two-horse cultivator and straddle the row, cutting it down to about six inches wide; after this has been done take a one-horse cultivator and work the ground thoroughly between the rows, then take the harrow and drag it crosswise until the ground is level and in good condition. This is about all the work that will be necessary and by this method I have had nearly as good a crop the second year as the first, and the work was mostly done with a team. Our varieties of strawberries are numerous, so much so, that there is not one in eight that proves a profitable berry to the grower. Many of the new varieties will only do well in certain soils and localities. We want more strawberries possessing the hardy habit, like the Crescent, that when they are planted, we are sure of a good stand. The Crescent, Warfield and Bubach seem yet to be our standard pistillates; while Beder Wood and Capt. Jack stand at the head as staminates. I expect soon to disseminate some new varieties that may prove valuable to the fruit growers. It is quite certain that these raised the standard of the strawberries sent from my fruit farm to the World's Fair.

DISCUSSION.

E. M. SHERMAN: We had a good crop of Jessie on heavy soil, with clay subsoil, while they are of no value here on lighter soil. Our Jessie were the best bearers we had; although not so great in number as Warfield, the yield was greater. We must pay particular attention to soil in choosing what berries to plant. Crescent is reliable, and the best to advise for general planting.

C. F. GARDNER: Would plow strawberry ground early in fall; again just before freezing, and again just before setting. By this method you will get rid of cut-worms and a great many insects. It will destroy the white grub.

N. A. REEVES: I always plow my garden just before freezing, and never have fears of cut-worms or other pests, so I can plant anything I want.

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ROSE HYBRIDS.

BY PROF. J. L. BUDD, AMES.

ROSA RUGOSA HYBRIDS. About ten years ago the Iowa Agricultural College imported from Russia types of the Rosa rugosa family, varying materially from the varieties introduced from China and Japan. The Russian forms prove hardier in the north, are more graceful in habit, and are finer in bud, fragrance and foliage than the Japan varieties. Prof. L. H. Bailey, of the Cornell University Experiment Station, says in *American Gardening* (June, 1892, p. 342), of these types:

"The form of rugosa from Russia, when grown side by side with the ordinary type, is about two weeks later to bloom, and a little darker in color. Where the ordinary rugosa has only two or three buds and flowers in a cluster, this one averages about four or five. The buds show a rich dark red between the narrow sepals, and besides being very long they are very pretty. * * * The blossom from which our engraving is made measures six inches across. * * * The double form of the rose introduced by Professor Budd seems to belong to the rugosa strain, and is known as *R. cinnamomea*. The blooms are six inches across, quite double, crimson in color, not quite so glowing as the type of rugosa, but more fragrant. The leaves are slightly serrated, bright green and leathery."

As to the history of these Russian roses we may state that Karl Koch[1] says that the *R. rugosa* is very closely related to *R. Kamschatica*, and differs from it chiefly in the fact that the bristly hairs are less closely crowded, and is destitute of woolly pubescence except on the points of growth. On the under surface of the leaves, however, the pubescence of *R. rugosa* is more prominent. Meyer and Siebold unite the two species, and other authors unite *R. Kamschatica* and *R. cinnamomea*, while Pallas describes the Siberian form of *R. cinnamomea* as *R. Dahurica*. The observations of the writer in 1882 in east Europe favor the opinion that these different forms all belong to the same species, and are not as much varied as the different varieties of our native plums.

The work of crossing began June 10, 1892, and was continued till early in July, the total number of flowers crossed being about 1,300. The number of seeds secured in the fall was about 20,000. The pollen of many varieties of cultivated roses was used, mainly of the Hybrid Perpetual and Tea classes. General Jacqueminot was chiefly used, as it produces a large amount of pollen. The pollen was mainly saved from flowers received from Des Moines and St. Louis. The stamens were removed before the buds opened, and the pollen was applied one, two or three days after, as the stigmas matured. One pound manilla paper sacks were used for covering the

[1]Dendrologie, Koch. Vol. 1, p. 238.

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blossoms before and after pollination. When the hips began to form, the paper sacks were removed and tree labels were attached. The hips were gathered when ripe and the seeds left in them until well cured. When taken out the seeds were mixed with sand and placed in the cellar until cold weather, when they were buried just below the surface on dry soil for winter freezing. Early in April the seeds were sown in a bed in shallow drills, and covered with lath screens until the seeds germinated. Many of the seeds were destroyed by moles and mice, and the extreme drouth following the wet of the spring destroyed a number of the young plants.

In the following list the pistillate parent is always mentioned first. It will be noted that *R. rugosa* was used in all cases as the pistillate parent, except as noted.

Rosa rugosa X General Jacqueminot.—Of 479 flowers crossed we had, on October 5th, 255 plants. They present some remarkable variations. As compared with pure seedlings the hybrids indicate weaker germinating capacity. As grown side by side, an equal extent of rows shows 106 hybrids to 166 of the pure rugosa seedlings. In size the hybrids are much the largest. Twenty-five of the tallest rugosa seedlings averaged 8.24 inches in height, ranging from 7 to 12 inches; the tallest being 11 and 12 inches respectively. Twenty-five of the tallest hybrids averaged 16.36 inches, ranging from 13 to 22 inches. The hybrids were much branched, so that the superiority in growth was more than the figures indicate.

The tallest hybrids showed the most marked modification in foliage. One hundred and thirty-two of the plants show marked variations, many of them showing no rugosity of leaf, while others are intermediate in foliage. Those following most nearly the rugosa type are small plants like the pure seedlings. The leaflets of rugosa are mostly crenate, while those of the hybrids showing no rugosity of leaf are serrate. The rugosa leaflets vary in number from five to nine, the usual number being seven, and a few of the points of growth only five. In some of the hybrids the usual number is five, with an occasional leaf bearing seven, and the leaflets average larger in size. Several of the hybrids have very small leaflets, and are dwarf in habit. Many show red color in the young leaves while unfolding, which is not found in the pure rugosa seedlings. On October 5th the pure seedlings had well ripened leaves and many were turning brown and yellow, while the foliage of the hybrids was still green. When put in the cellar, November 4th, the pure seedlings had shed their leaves, while many of the hybrids still had green foliage.

Six of the hybrids showed bloom the past summer, some before they were four months old. All of them showed an increased number of petals. Rosa rugosa has five petals, varying in color from crimson to pink and white. One of the hybrids had fourteen petals and was pink. Another, blooming when three inches high, had twenty-eight petals with the brilliant color of General Jacqueminot. None of the pure rugosa seedlings showed signs of blooming. A few of the hybrids showed mildew on the points of growth as the cold nights came on.

Our experience the first year indicates:

1. The staminate parent, General Jacqueminot, has materially modified the foliage.

2. The hybrid seedlings greatly exceed the pure seedlings in vigor of growth.

3. The hybrid seedlings show a tendency to early blooming not indicated by the pure rugosa seedlings.

A total of 289 flowers of Rosa rugosa were crossed with pollen of the following varieties and 164 plants obtained: Duchesse de Brabant, La Marque, Harrison's

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Yellow, American Beauty, Harrison's White, Triumph de Exposition, Rosa rugosa fl. pl., Madame Masson. The double form was also crossed with Multiflora and one plant saved.

These seedlings are indeed a very interesting study. The plants that show the most marked modification in foliage are the strongest and most thrifty in growth. As a general rule the male parent has caused much change in character of leaf. At this time it will not be necessary to detail these changes, as we will report later when the plants bloom.

Our wild roses, *R. Arkansana* and *blanda*, were crossed with Gen. Jacqueminot and four out of nineteen plants show change in foliage. These four showed no mildew although many of the other fifteen did.

A large number of blossoms of Rosa rugosa and other species were crossed with our best garden roses but the seed did not germinate, but we hope will grow next spring.

Time to apply pollen.—We have thirty-seven plants not noted above from a cross of R. rugosa and General Jacqueminot. In this case the stamens were removed in the morning from thirty flowers which had opened during the night, and the pollenizing performed in the afternoon of the same day. All except two of the plants have the leaf of the rugosa. This indicates that the stamens should be removed one or two days before the blossom opens, as was done in all the other crosses made.

Very dry pollen.—Our experience in these crosses and in all our crosses of the orchard fruits indicates the best results from the use of very dry pollen. This is especially true in crossing the rose. In some cases we secured a good stand with very dry pollen, and a very small stand with that only partially dried.

PROBABLE RESULTS.

The lack of hardy double roses for the prairies of the northwest is well known. All the choice varieties must be carefully protected in winter, and many refuse to bloom with the best of care.

The beauty of foliage and undoubted hardiness of R. *rugosa*, especially the Russian types, has called the attention of many to the probable valuable results of crossing it with our best garden roses, and some work of this kind has already been done. But the hybrids which up to this time have been tested are from the Japan type. Madame G. Bruant is a hybrid between the Japan rugosa and a Tea rose (Sombreuil). The hybrids of E. S. Carman are from the Japan rugosa crossed with Harrison's Yellow, several of the Hybrid Remontants and the Hybrid Teas; and a number of varieties have been produced with double, or nearly double, flowers which are specially fragrant, and with more or less traces of the handsome foliage of the mother. As with us the varieties follow most closely the male parents. The hardiness and freedom from mildew is not specially promising. Our hope is that among our many varieties we will secure a few with the hardiness and approach to the leaf of the rugosa, with flowers rivaling in beauty and fragrance the Hybrid Perpetuals and the Teas.

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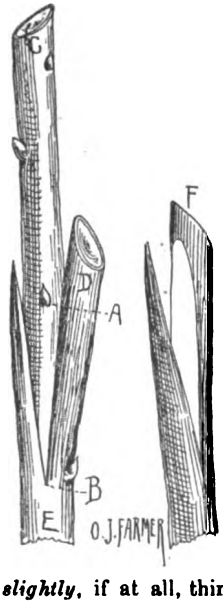
TOP-GRAFTING.

BY PROF. N. E. HANSEN, AMES.

As several papers on top-grafting will be presented at the various horticultural meetings this winter, it may be of interest to describe briefly the method of doing the work. This paper is intended only for the instruction of beginners who do not have an opportunity of personal observation in a nursery or orchard at the proper season. Half a day's work with an experienced grafter will be better than volumes of reading without practice.

Plums and cherries should be grafted before there is the least sign of starting of the buds. Hence, pleasant days in March should be improved in this manner. However, they may be grafted after the buds have started, provided the scions have started equally as much. In general it is best to graft the stone fruits early.

Apples and pears may be worked later, even after the buds are well started. When they begin to swell is a good time. The best method is known as side-grafting" or "wedge-grafting," and is illustrated herewith:*



Cut the scion B, C, wedge-shaped at the lower end with perfectly true and straight sides, so it will fit snugly into the incision in the stock. The length of this wedge-cut, one and one-half to two inches, depends on the size of the scion, a large scion requiring a large cut. Take the scion from the previous year's growth, and let it contain about four buds, besides the bud A, at the base. The stock E, D, must have a ring of bark left at D. This is better shown at F, which represents the stock before inserting the scion. No wood is removed from the incision in the stock, simply a cut is made, being careful to cut across the grain slightly so as to avoid splitting the wood. Use a sharp, thin bladed knife. If this incision in the stock is properly made, the scion will be held very firmly by the natural spring or elasticity of the wood. It will be found most convenient to cut off the part of the stock beyond D, after making the incision in the stock, and before inserting the scion.

In cutting the scion, make the inside of the wedge-cut thinner than the outside, so that the scion will fit neatly; but this is often overdone, so that there is too great pressure on the cambium layer (layer between the wood and bark) for proper union. So make the inside of the wedge-cut *very slightly*, if at all, thinner than the outside. The vital point to be noted is that

*The cut is furnished by courtesy of the Orange Judd Farmer, Chicago, Ill., from an article by N. E. Hansen on top-grafting.

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the inner barks of the scion and stock must be brought together, so that union can be made when growth begins. After inserting the scion, apply alcoholic plastic to the point of union B to D, and wrap with a strip of old, thin, white muslin. The cloth will adhere to the slightly warm wax and no string is needed for tying. The exposed tip of the scion, C, must be touched with the plastic to prevent its drying out.

Recipe for Alcoholic Plastic: One pound white resin, one ounce beef tallow, one tablespoonful turpentine, five or six ounces alcohol. Melt resin slowly, take from fire and add tallow, stirring constantly. When still cooler, add turpentine slowly, then alcohol. Wood or methyl alcohol is cheaper than common alcohol and, as tried at the college, seems to answer the purpose equally well. It is poisonous and should be so labeled.

If the plastic becomes too stiff to work well, put vessel containing it in a vessel of hot water and add more alcohol. In out-door grafting, the vessel is set in the top of a large lantern-shaped tin box with a lamp inside. It is most convenient for two to work together, one to graft and the other to apply the plastic. The terms "top-grafting" and "top-working" are the same, the latter being more generally used in nursery work.

The method just described is better in most cases than the whip or tongue graft. However, where the stock and scion are both small and of about the same size, the latter method will answer every purpose. By comparing the two methods it will be seen that the side-graft is preferable, because it has two surfaces on the scion to unite by, while the whip-graft only has one. Side-grafting can also be used in the spring when crown-grafting seedlings where the budding failed the preceding autumn. Also for root-grafting cherries, plums and pears, using the whole root. This has been done every winter at the Iowa Agricultural College for many years. In root-grafting the point of union is wound three or four times both at top and bottom, with waxed thread. The plastic is then applied with the thumb and finger, the graft run through sand so grafts will not stick together, and then packed away in sandy earth in boxes in the cellar or cave, keeping the temperature as near freezing as possible to prevent injury from the graft-box fungus. The waxed thread is made of No. 18 knitting cotton run through melted wax onto an open drum or hollow cylinder of wood with a crank handle attached. The wax is softened with a little linseed oil.

Care after grafting: The "robbers" or sprouts appearing on the stem below the graft must be removed so the scion will have a fair chance for vigorous growth. If this is not done the graft will make but a feeble growth or perish altogether for lack of nutriment.

In top-working young trees in the nursery it will not do to strip all the leaves appearing on the stem below the graft. All the buds for a short distance just below the point of union should be allowed to expand foliage in order to "draw up the sap" and cause vigorous growth. If these buds push too strongly keep in check by pinching. As the graft grows, these leaves on the stock can be gradually removed, beginning with the buds next to the graft.

In top-working cherries and plums, the outer bark often becomes dry and tough so it will not expand to make room for the deposit of new wood in June. The graft is in danger of perishing from tight-lacing and the corset strings must be cut. Do this by slitting the bark of the stock lengthwise in several places, from the graft to the ground, taking care not to cut into the wood as this is apt to cause gumming.

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Young apple trees may be top-grafted the same season they are planted in the orchard, but it is usually better to wait until the next spring. In the eastern states old trees are often top-grafted, and the whole top changed, but in the dry air of our western states it is a failure, as a rule. Where trees of good size are top-worked it is best to change only part of the top in any one year, taking about three years to complete the work. In the northwest it is best not to cut limbs more than an inch in diameter. On young trees in the nursery it is usually best to top-work in the limbs, close to the main stem, so that the forks will be of the hardy stock. But for commercial purposes this would hardly be feasible, as it would considerably increase the cost, and the average planter would not be willing to pay what the trees are worth. The planter should learn to do the work himself, as it is one of the keynotes to success in prairie orcharding.

The general experience in top-grafting plum trees in the nursery is not favorable. Especially is it a poor plan to top-work European varieties on native stocks; the top outgrows the stock and is injured or blown off in strong winds.

Rabbit-gnawed Trees.—In many young orchards much damage is frequently done by rabbits wholly or partially girdling the trees. If the injury is slight, and the bark is cut through in a few places only, bank at once with mud held in place by a cloth. This will prevent drying out and facilitate healing of the wounds. If the damage is severe, the trees are sawed off at the surface of the ground and two scions inserted, one on each side, in the stub. The scions are cut as described for side-grafting, but the stub is cleft or split. If both grafts grow, cut off the weaker one when well started. The top of the other may be pinched back when four feet high to cause proper branching. The scions may be taken from the sawed-off top. The graft grows readily and will soon form a desirable tree.

DISCUSSION.

C. G. PATTEN: We are in need of a hardy class of roses all over the northwest and the experiments of Prof. Budd will probably result in producing them.

RECENT INTRODUCTIONS.

BY JOHN C. FERRIS, HAMPTON.

The same mail which brings the program assigning me this subject brings a letter of inquiry from a farmer who seeks light as to recent introductions. This letter is one of many of a similar character, and will serve to show how little the a b c of horticulture is understood by tree buyers, and how agents presume upon the ignorance and credulity of the farmers. I copy it here and also my reply. I do not tell Mr. Rodman anything new, yet if the facts I give him were generally known, foreign agents could not so impose upon the tree-buying public with budded trees, foreign stocks, and reproducing seedlings. Mr. Rodman writes:

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GLIDDEN, IOWA, December 10.

JOHN C. FERRIS: SIR.—I just want to bother you a little more. I want to know which is best, a tree grafted in root or top or a budded tree, and why? And is a tree budded on imported root better and more expensive than a tree budded or grafted on a sprout grown in this country, and why? There has been an agent through here. He stopped at my place three different times but I was not at home. He was selling trees for the Le Mars nursery, I think. He claimed to be selling nothing but budded trees on imported roots. He claimed that a grafted tree would never stand the test; that they would sooner or later rot at the graft and break off. He also claimed that as a rule the nurseries would go to a cider press and get apple seeds and plant to grow sprouts to graft on, and said seeds were of sour or sweet apples, as the case might be, and there is no certainty about your fruit; that the root and the top might not be adapted to each other; that some roots were so much stronger than others that they would force more water vapor up into the body of the tree than was necessary, and a sudden freeze was sure to injure or kill the tree entirely. He also claimed that a budded tree on an imported root will prevent all that. Also they are free from blight or insect injury, or rabbits. He claimed to replace all trees killed by rabbits; that they will not touch them. These things seem strange to me. I have had many trees injured by rabbits, and I always use a preventive. Let me hear from you. If this is a fact I am on the wrong line, or in other words I am "not in it."

Yours respectfully,

J. W. RODMAN.

Mr. Rodman, having been many years planting root-grafted trees, feels that he has wasted precious years or somebody has lied. To re-assure him I wrote:

HAMPTON, IOWA, December 12, 1898.

J. W. Rodman, Glidden, Iowa:

DEAR SIR—Your letter of inquiry is at hand. As you have been many years one of my patrons, I shall take pleasure in answering your questions. You want to know which is best, a grafted or budded tree, and why? I answer there is no difference if bud and graft are inserted at the same point. You ask if a tree budded or grafted on an imported root is better and more expensive than a tree budded or grafted on a "sprout" grown in this country, and why. I answer there is not much difference in cost of home grown and imported stocks for grafting. If any, the imported stock is the cheapest, and the home grown the hardiest. The truth is that all nurseries deliver root-grafted trees and it is an open secret that the budded tree story is an invention of agents to catch suckers. Nearly all seedlings are tender. The imported French crab is one of the tenderest stocks. The bud must be inserted above the ground hence the budded tree cannot have any but a seedling root. A root-grafted tree has its union beneath the surface and emits roots above the graft, hence it has a system of roots hardier than the seedling. I have seen all the roots below the graft winter-killed and those above the union uninjured. This happened in my nursery at Chamberlain, South Dakota. A root-grafted tree is much the safest in cold climates. Our best hope for winter apples is a good hardy root-graft like Oldenburg, Recumbent, Whitney, or Virginia, again grafted in the top with Melinda,

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Northwestern Greening, Scott's Winter, Roman Stem, or any of our hardiest winter apples. As for the story that a root-grafted tree will break off at the graft, it is absurd since the union is below the surface of the ground. The kind of seed planted to raise a stock on which to graft has no influence on the character of the fruit of a root-grafted tree. That is determined by the kind of a tree the scion is cut from. Much of the stuff told by your visiting missionary is too silly to notice. It is sufficient to say he lies like a thief when he tells you that budded trees upon imported roots are exempt from sun-scald, blight, winter, and insect injury and rabbits. Why don't you shoot him? If your neighbors are caught with such chaff you need the fool-killer down there. Now, friend Rodman, the truth is that one man's trees of a given variety are about as good as another's. If you pay one dollar each for trees that you can buy for twenty-five cents each, you pay seventy-five cents each tree for the lie the agent tells you. They have been selling hardy peach trees up here.

Yours truly,

JNO. C. FERRIS.

The foregoing shows the sublime cheek of the budded tree agent, the childlike gullibility of his victims and the legion of absurdities the horticulturists have to combat. Suppose we do discover a principle that shall revolutionize our present methods or produce new varieties of great merit, moving orcharding in the northern district from the domain of experiment to that of a most lucrative industry, how shall the public distinguish between our fact and the fiction that comes with "recent introductions." We no sooner score a point than some foreigner appropriates it and cashes it. He completes our experiments and cashes them before we dare to introduce them. We suggest that peaches may be produced by laying down and covering the trees in winter. A man from Ohio sells thousands of peach trees perfectly hardy in Floyd and Cerro Gordo counties. He gets fifty cents each on delivery, and fifty cents in peaches the second year. We try the Russian pear trees and hope to find one free from pear blight. Ohio sends thousands warranted to endure our most trying summers and winters. Mr. Gaylord or Mr. Heisz experiments with Northwestern Greening as a top-graft. Eastern men sell acres of the trees root-grafted. And so horticulture is handicapped because not better understood. We dare not be just to ourselves in reporting progress in experimentation, lest the public suspect us of fraud or dealers report us with many embellishments of their own and bring reproach and discredit upon our earnest endeavors. If progress is made new varieties must be introduced. The public must choose between the novelties of foreign agents and the results of home experiments. Many things of merit have come to us from other states and other countries, but all such have been or are now on trial at experiment stations, and the reports from these stations are published in our reports. To describe all the absurd and impossible things offered by enterprising agents would not be possible, much less profitable.

I will only name a few of the new varieties being grown by nurseries in this district. Several new apples are being offered and some of them promise success. Melinda is an old variety renewed through the efforts of Mr. Edson Gaylord, of Nora Springs. The tree is not quite hardy in nursery, but is a good orchard tree and should be planted by those who

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want a nearly sweet apple that can be kept through the winter. Northwestern Greening is being quite extensively planted. It seems to be hardy as a top-graft, but former experiments condemn it as a root-graft. It is a winter apple of great merit. Patten's Greening is now becoming quite popular and perhaps should not be classed with recent introductions. Kaump is well known and very popular in the northwestern district. It is an immense and reliable bearer. There are many Russian apples of great merit, but the list is too long for this paper. The Recumbent or Hibernal family is in demand where extreme hardiness is desired. Longfield is very productive and much hardier than it has been considered. No. 169 Regel, is a fine tree and the fruit keeps until spring. Moore's Arctic plum has proven tender in nursery, though old trees are still thrifty and productive. A large, dark blue plum introduced by Wm. Schultz, of Franklin county, is apparently hardy and productive. He calls it German prune. The sprouts were imported from Germany. I have at Hampton a Black Hills black currant of much merit, also a golden currant of the same species. Both are productive and good and exempt from the almond-like flavor characteristic of black currants. North Star currant is too new for intelligent report. Those seeking light as to new small fruits and flowers, should join our society and get a volume of our transactions and read the reports of experiment stations. They are much more reliable than reports from Ohio nurseries where they grow all the choicest fruits from seeds without the trouble and expense of either grafting or budding. The budded tree story is tame compared with the marvels related by the man who sells reproducing seedling apple, pear, peach and plum trees. Since the birth of this society, nine years ago, we have warned the public, through our reports and through the farm and local papers, against this form of swindling. It is a question whether the evil has been abated. As soon as one lie is killed a bigger one is born. As this form of obtaining money is a greater crime than theft, and as other states treat and punish it as a crime, we are likely to be suspected of at least tacit consent, while we fail to ask our legislature to protect the people from the fat, lazy villains who lie awake nights to invent new lies with which to deceive hard working, credulous farmers. Iowa should have a law to prevent fraud in the sale and delivery of nursery stock. General laws do not seem to touch this special crime, and the evolution of horticulture does not keep pace with the evolution of the tree agent. I do not believe the horticulturists of Iowa can afford to permit such swindling to go unrebuked. I believe it is our duty to join the farmers in a crusade to rescue our profession from the disgrace such men bring upon it. We shall be accused of jealousy, and every one who publicly protests will have his record closely scrutinized. Every nurseryman has enemies who will furnish or invent evidence which agents will use to his harm. Let him who fears this kind of persecution hold his peace. Such will say, "Let him who is guiltless cast the first stone." I know we are all depraved and fellow creatures, but some of us should retain something of the purity and honor with which the Creator endowed the first horticulturist when he placed him in the first orchard of Eden. If we are content to profit by the public ignorance and permit the craft to do the same without protest, let us not charge it to total depravity and Father Adam. Each should answer for his own sins and not plead the sins of his race in extenuation of his evil

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deeds. It may be very candid to admit that all men are evil and that we are no better than our neighbors, but such admission does not promote honor and the public weal. It is a deplorable truth that business is a selfish struggle for advantage and gain, but it is circumscribed by some rule of ethics, and when downright lying is resorted to it is time for protest and denunciation at least. The agent is a necessary factor in introducing new varieties, but if he is a lying swindler the fact that he is an agent should not excuse him from censure and punishment. We should demand that our agents use only honorable methods to obtain orders, and then demand that the public treat them with the respect due to all honorable business men. An honest agent deserves more respect than a dishonest banker or nurseryman.

REPORT FROM WEBSTER COUNTY.

BY SILAS G. GOSS, BORDER PLAINS.

The season of 1893 was one of good tree growth, with seasonable rains in the fore part of the season, without the usual heavy June rainfall. The latter part of the season was too dry, making potatoes 75 to 90 cents a bushel. The spring was late in warming up, but as the season advanced it was so hot that tomatoes and melons were plenty, although a little late. It was so hot and dry while apples were ripening that it made the insects lively, and fruit was badly bored and gouged, causing it to rot. Some varieties, notably Tallman Sweet and Transcendent, did not bloom enough to bear ten per cent of a full crop, caused, apparently, by a very wet July in 1892. Oldenburg, English Pippin, McIntosh Red, Borovinka, 38 Voronesh, and a few of my seedlings fruited well, so well that if my trees were all of those varieties I would have had about forty times as many apples as I did have. Harry Kaump bore very full for young trees, but the fruit, although much larger than the crabs, is too small. My new Gideon's hundred varieties of seedlings were selected for their early ripening of terminal growth. About a dozen of them have fruited, and all too small, the best one being about the size of Transcendent, though of much better quality, with also a better tree from blight.

Ostheim cherry, from Canada, about four to five years old, were set out this season by a neighbor and they all died.

Plums are profitable here. Miner fruited well on an upper bench of dry land near the river, but here on the prairie it was only about fifteen per cent of a full crop. De Soto blooms later than Wyant and has, heretofore, fruited better, but this season Wyant bore an over full crop equal to De Soto. Harrison's Peach bore a moderate crop, its first fruiting here. It and Forest Garden are not fruitful enough to be profitable. Wolf does not bear young but appears to do well with age. Hawkeye was full of very large plums for so young a tree but fruit is sour like Wolf and not as good as Speer and De Soto. Speer had a light crop of very good small fruit. Moldavka fruited for the first time on my grounds. It does not

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bear early but the tree is hardy, free from all diseases, and does well on low, flat prairie. The fruit is large, long-necked, colored all over alike with an ashy yellow, early ripening and excellent quality. Hungarian No. 1 is a wide-spreading, thick-limbed tree, does not bear young, and fruit rather small, about size of Speer, very dark blue with heavy, lighter colored bloom, quite sour and very late in ripening—a cooking plum. Bixby blooms out late for so early ripening fruit, like Clemon's Seedling in lateness of bloom but much larger fruit. This, like Marianna, is very easy to graft. Marianna bears well on Miner and outgrows that fast growing variety.

Janesville grape is as early and better in quality than Tallman or Champion, but smaller in berry. My choice, so far as fruited, is Janesville, Worden, Pocklington and Woodruff Red.

Of Russian Mulberries I set out about 110 small trees supposed to be seedlings. They have grown up from three to eight feet tall. Several of them fruited. One little one has a creamy white, very sweet fruit; the others are black.

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TRANSACTIONS

OF THE

NORTHWESTERN IOWA

HORTICULTURAL SOCIETY

For 1893.

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LIST OF OFFICERS.

PRESIDENT.

M. E. HINKLEY, - - - - - - - *Marcus.*

VICE-PRESIDENT.

P. F. KINNE, - - - - - - - *Storm Lake.*

SECRETARY.

W. B. CHAPMAN, - - - - - - *Correctionville.*

TREASURER.

BEN SHONTZ, - - - - - - - *Correctionville.*

DIRECTORS.

Lyon County, J. T. Alexander.....Rock Rapids
Sioux County, W. J. Newell.....Hull
Plymouth County, Pierre Bechtle.....Le Mars
Woodbury County, W. T. Worth.....Climbing Hill
Monona County, Addison Oliver.....Onawa
Ida County, D. Nichol.....Battle Creek
Cherokee County, E. O. Freeman.....Cherokee
O'Brien County, J. S. Haag.....Hospers
Osceola County, Mrs. Celia Johnson.....Ocheyedan
Dickinson County, U. S. Bruns.....Milford
Clay County, Mrs. Julia Higday.....Spencer
Buena Vista County, L. A. Clemons.....Storm Lake
Sac County, Mr. Edson.....Sac City
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Greene County, Albert Head.....Jefferson
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Emmet County, Mrs. L. R. Bingham.....Estherville
Kossuth County, M. D. L. Parsons.....Algona
Humboldt County, Ed. Conners.....Humboldt
Webster County, W. C. Haviland.....Ft. Dodge
Boone County, John Friedly.....Boone
Crawford County, H. C. Lamb.....Denison

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Alfred, A. T.....Le Mars
Atwood, John.....Le Mars
Bogen, J .....Le Mars
Brown, A. P.....Le Mars
Berner, Otto G.....Le Mars
Bunn, J. A.....Correctionville
Bowers, Anthony.....Correctionville
Bechtle, Pierre.....Le Mars
Brick, P. L.....Le Mars
Bruene, Henry.....Correctionville
Carpenter, Noah.....Le Mars
Chapman, W. B.....Correctionville
Cummings, G. H.....Sioux City
Custer, G. W.....Correctionville
Conklin, H. C.....Correctionville
Cobb, J. U.....Correctionville
Conklin, William.....Correctionville
Chapman, T. K.....Seney
Condon, John.....Le Mars
Chassell, E. D.....Le Mars
Dewey, J. A.....Kingsley
Dewell, M. F.....Cushing
Dolman, D.....Correctionville
Emery, J. C.....Carnes
Furawski, John.....Le Mars
Freeman, E. O.....Cherokee
Felter, H. L.....Washta
Ferrin, Lee.....Marcus
Goebel. John C.....Le Mars
Horman, George.....Le Mars
Hillebrand, C. M.....Le Mars
Hinkley, M. E.....Marcus
Haag, J. S.....Hospers
Hill, Donald.....Storm Lake
Hatfield, A. W.....Correctionville
Hermann, F. J.....Le Mars
Hoffman, C. D.....Le Mars
Herling, Gustav.....Le Mars

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Huebsch, J. C.....Le Mars
Haas, C. E.....Le Mars
Kinne, P. F.....Storm Lake
Keyes, J. H.....Pierson
Kohl, C.....Le Mars
Keck, L. C.....Washta
Leek, Levi.....Correctionville
Linden, John.....Le Mars
Lewis, R. A.....Cherokee
Miller, Geo.....Holstein
Mielke, Henry.....Le Mars
Mathias, John N.....Le Mars
McCoy, R. N.....Sargents Bluffs
Moore, M. A.....Le Mars
Marcue, W. G.....Le Mars
Petty, W. H.....Correctionville
Richardson, Geo. E.....Le Mars
Robbins, O. M.....Correctionville
Robbins, D. H.....Correctionville
Smith, George M.....Le Mars
Sipma, S. R.....Orange City
Shontz, Ben.....Correctionville
Sibley, C. H.....Le Mars
Steele, Robert.....Le Mars
Simkins, W. A.....Le Mars
Steiner, A. B.....Le Mars
Steinman, C.....Mapleton
Terrill, H. A.....Sheldon
Wernli, J.....Le Mars
Wetmore, George I.....Rock Branch
Wood, K. O.....Hawarden
Westfall, A. J.....Sargents Bluffs
Wilson, G.....Le Mars
Watkins, F. T.....Le Mars
Veidt, George.....Merrill
Vackebeig.....Le Mars
Varvel, A. J.....Correctionville

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Elmer Reeves.....Waverly
M. J. Wragg.....Waukee
W. M. Bomberger.....Harlan
Prof. J. L. Budd.....Ames

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PREMIUMS FOR THE DECEMBER MEETING, 1894, TO BE HELD AT LE MARS.

Best collection of apples and crabs grown in one county of northern district..	$ 5 00
Second best collection of apples and crabs grown in one county of northern district.....	2 00
Best collection of apples and crabs grown by exhibitor in northern district..	5 00
Second best collection of apples and crabs grown by exhibitor in northern district.....	2 00
Best collection of seedling apples grown by exhibitor in northern district...	3 00
Second best collection of seedling apples grown by exhibitor in northern district.....	2 00
Best seedling apple not previously exhibited, age of tree considered.....	2 50
Second best seedling apple not previously exhibited, age of tree considered..	1 00
Largest and best display of canned fruits.....	4 00
Second largest and best display of canned fruits.....	1 50
Best jar of following fruits not included in general collection: Strawberries, black raspberries, red raspberries, blackberries, gooseberries, red and white currants, plums, grapes, 50 cents each.....	4 50
Best plate each Wealthy, Haas, Tallman Sweet, Harry Kaump and Russian varieties.....	50
Best plate of any variety of apple thought worthy of cultivation, not included in above collection, each.....	25
Best plate grapes, any variety.....	50
Best collection geraniums.....	50
Second best collection of geraniums.....	25
Best collection of chrysanthemums.....	50
Second best collection of chrysanthemums.....	25
Best collection of begonias.....	50
Second best collection of begonias.....	25
Best collection foliage plants.....	2 00
Best specimen plant in bloom.....	1 00

Other articles exhibited may be awarded premiums by a vote of the society if considered worthy.

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PROCEEDINGS

OF THE

SECOND ANNUAL SESSION

OF THE

NORTHWESTERN IOWA HORTICULTURAL SOCIETY.

HELD IN LE MARS, TUESDAY AND WEDNESDAY, DECEMBER 12 AND 13, 1893.

MORNING SESSION—TUESDAY.

The meeting was called to order by President M. E. Hinkley, who first called for report of the directors.

H. A. TERRILL, of O'Brien county: The fruit crop with us this year has not been the best. There were very few apples. Trees that were loaded a year ago showed very few specimens this year. The small fruit crop was not large. There were but few strawberries in my vicinity, though mine did fairly well. Raspberries where protected were a fair crop. There were a few plums. I had a few trees set two years ago which were full of fine specimens. Of grapes there are hardly any grown. I know of only two or three persons having vines in bearing, and they gave very small returns this year.

R. A. LEWIS, of Cherokee county: About the same report as from O'Brien, except that grapes and plums were an excellent crop this year. Last year where we had barrels of apples, this year we counted them by the dozen. Raspberries were a fair crop, not large, and strawberries were light.

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GRAPES FOR NORTHWESTERN IOWA.

BY CHRISTIAN STEINMAN, MAPLETON.

I will try to give some of my experiences the past thirteen years on my own grounds at Mapleton. Everyone who has a farm or town lot ought to raise his own grapes, and at the same time teach his children how to take care of them.

The whole State of Iowa, more or less, is adapted to the growing of the grape. If you go above the line of the last frost in spring you will be also above first frost in the fall. You want good air drainage; a porous soil, if poor, made rich by manure; wood ashes are very good. My choice would be a southeastern slope, not too steep, so the cultivator will throw the dirt both ways. High upland and second bottom need not be rejected. Plow or dig up the ground twelve to eighteen inches deep; if two feet, there is no harm done. If the ground is poor mix in plenty of compost—you can not very easily make it too rich. Fifty to seventy-five vines will supply a good-sized family. Plant rows eight feet apart and from four to six feet apart in the row. I would plant about four or five different varieties, early and late.

It is often the case that some let their grapes grow for a number of years with but very little care, and the vines look worse than those in the woods, or get too old. The best thing you can do is to saw or cut them off close to the ground; you will be surprised how strong new wood they will produce; but let only two or three shoots grow. These you cut back about half the next time you prune, and by proper care you will get extra fine fruit after such management.

The white varieties I raise here are Lady, Niagara, Pocklington and White Ann Arbor. My black varieties are Worden, Moore's Early, Concord and Janesville. My red varieties are Brighton, Delaware and Vergennes.

Janesville is the earliest grape I raise here; as hardy as our wild grapes, somewhat sour, very firm, not as juicy as others but one of the best for canning.

Everything considered, Worden is one of the best. With Moore's Early I have not had such success; in ten years I had only about three good crops, with one total failure and the others partial. This sort does not seem to stand wet weather very well; you can tell a Moore's Early vine in the summer from a distance. The Concord is one of our best standbys.

Of the light colored grapes, the Lady is one of the best in quality, a little slow in growth, but hardy and fruitful. Niagara is a fine grape, a good grower and bearer, but not as hardy as Lady. Pocklington may be one of the most profitable of this class, but is sometimes lacking in hardiness, clusters compact and large.

White Ann Arbor is a very good grape, an excellent keeper but a poor grower with us and not to be recommended; needs always to be covered in winter.

Of the red varieties I raise, the Brighton is the best; an early and first quality

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grape, berries and clusters fair size but not as hardy as Concord; needs covering in winter. Delaware for quality has very few superiors if any; of high rank, berries and clusters small. On rich and high land with proper care, it will bring good returns; it is too good for a common market. The Delaware is a young plant and a slow grower, but when older it will grow faster. It pays to lay down and cover in winter. A crop of grapes can be made as sure as a crop of corn and yet how few have all they want.

DISCUSSION.

PROF. WERNLI: Grapes are a great success with me. Moore's Early has not done very well with me, but my vines are only three years old and the winter took most of them last year, on account of the drouth I think. I thought nothing could beat the Concord, but will now give up to the Worden. I think it is the very best grape we have. I consider Champion too tender for us. I like Pocklington very much. Agawam is a very fine grape, fast grower and stands our soil and climate. I don't believe in much summer pruning. Go among my vines in August and September and you will have to hunt for the grapes. They are loaded but the fruit is covered. I think this is absolutely necessary that the fruit may ripen properly.

MY EXPERIENCE WITH SMALL FRUITS.

BY B. SHONTZ, CORRECTIONVILLE.

I started in the small fruit business three years ago. I cannot say that I have have had very big success yet, but I am learning. The trouble of the last few years has been to get a good stand on account of the drouth. Of raspberries I have four or five different varieties, but they must all be protected. I had no blackberries this year because of the failure to cover the vines last winter. I protected my grapes and had a fair crop this year on three-year old vines. I plant only one-year old vines. Of raspberries I have Tyler, Ohio, Mammoth Cluster and Shaffer. The Shaffer is a good berry, gives a good crop, and keeps in season longer than any other; quality not so good as some, but sells well. I consider the Beder Wood strawberry the best fertilizer. Beder Wood and Warfield ship well together. Warfield is the first berry to ripen, and lasts longest; keeps its size to the last of the season, and makes many plants.

The secret of small fruit growing is thorough cultivation. Go through the plants every eight or ten days and cultivate shallow. I never mulch grapes; if you manure them use manure thoroughly rotted.

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DISCUSSION.

J. A. DEWEY: Has any one had experience with the Cuthbert raspberry?

ELMER REEVES: It is a very fine red berry, but not very hardy. It is one of the best market berries. It is larger, more solid than the Turner, and will outyield it.

H. A. TERRILL: What about the Kenyon seedling?

ELMER REEVES: I have had it one year. I had a few berries, and they were very nice.

M. E. HINKLEY: I got a few plants three years ago. They fruited remarkably well last year without any protection. My opinion is favorable to it, and I intend to propagate it for my own use. I think it will do better than the Turner.

PEACH CULTURE IN NORTHERN IOWA.

BY D. W. LOTSPEICH, WOODBINE.

It is profitable to grow some of the tender fruits, we think, after experimenting for a number of years with peaches. When we commenced we thought our zero weather was all we would have to contend with, but when this difficulty was overcome another was at hand. The curl leaf caused most of our fruit to drop before maturity one year, and one year the mice girdled and ate the buds off of some of our trees. But what have any of us accomplished without overcoming difficulties? and we are sure they are not more numerous in growing peaches than they are to profitably grow blackberries, raspberries, grapes, and we might say apples.

Did you ever pick a nice rosy peach off the tree when it was so ripe it would almost melt in your mouth? Then you know how good a peach is. We have bought the green, sour, insipid peaches in the market, but not one in a dozen was fit to eat.

If you can grow grapes you can grow peaches. We have said this a hundred times and have been asked as often, *how?*

We commenced nine years ago by planting some seedlings near a bank that we had graded down for the purpose, expecting to stand corn fodder against the trees and press them to the bank; the site being chosen with a view that the snow would drift over all, as it did. But when the snow melted and settled, it broke our trees badly and some places the water running over the bank caused it to break and fall on some of them, and bent them over to the ground. We were almost discouraged and allowed them to lay in that position for two years; and then we took new courage and thought we would see if we could get some of them down to the ground, and found that the trees that were being held down by chunks of earth

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and made an upright growth were very easily bent to the ground without injury. And how we did rejoice when we were *sure* we had found the key to success. But as you have seen there were other difficulties in the way. But we are so sure we can grow peaches profitably, that we planted fifty budded trees last spring.

It has been our experience that to grow about three trunks from each root is best. We then bend all to the ground in the fall in the same direction, in fan shape, just far enough apart so that they will not touch when they have attained size. If the trunks have not grown five feet high before laying down in the fall, allow them to stand upright in the spring until they do, and always keep each trunk trimmed to a single stem. Now in the spring after you have taken the covering off, turn up the extreme top of each tree or trunk about four feet from the root, and tie to a stake and encourage upward growth of the erect portion. In the fall cut your trees loose from the stakes, and press them down to the earth to the right or left and fasten, covering with some coarse mulch. It is easier to bend three stems two inches thick than it is one six inches. Plant your trees where the snow is liable to drift, always remembering that "as the twig is bent the tree is inclined."

DISCUSSION.

ELMER REEVES: I want to offer a caution. I have tried several varieties of peaches. I knew they would not stand our winters so I covered some with earth and others with straw or coarse manure. In all cases the trees were dead before spring. I have planted seeds and grown seedlings but the buds rotted when the trees were covered. Prof. Budd says his imported varieties will not injure from winter protection. I have also tried a variety grown near Muscatine. The buds seem hardy enough to stand winter protection. I have not fruited any yet but have great faith in them.

M. E. HINKLEY: There is a fruit grower in O'Brien county who is growing peaches and there is a can of peaches in the fruit-room grown in Woodbury county without protection. Prof. Budd says we can grow them easily if the trees are laid down in winter.

TUESDAY—AFTERNOON SESSION.

THE OUTLOOK FOR SMALL FRUIT GROWING.

BY H. A. TERRILL, SHELDON.

Every climate has its advantages and disadvantages, and the successful pursuit of any calling that depends for its returns on favorable climatic influences

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consists largely in making the most of every favorable influence and doing everything possible to modify and overcome what is unfavorable. The small fruit grower of northwestern Iowa has, it seems to me, many obstacles to surmount, and he who plants expecting to eat or sell from his planting without thoughtful work and constant intelligent attention to his vines and bushes, will certainly harvest little but disappointment and disgust and the "I told you so's" of neighbors and friends.

I have lived but four years in Iowa and during that time have been led by observation and experience to modify many opinions formerly held concerning prospects, methods of cultivation, etc., and any opinions expressed in this paper are, like the prices in many catalogues, "subject to change without notice."

With our fertile soil, easily cultivated, and that resists drouth to a wonderful extent, we have difficulties also that are to be overcome, if possible, and of a few of these I have thought best to speak, hoping that the discussion to follow will shed additional light on the subject.

Probably nine out of ten of those who have given the matter little thought, if asked what is the greatest obstacle in the way of profitable small fruit culture in this part of the State, would reply, without much hesitation: "The severe winters, to be sure." Certainly, the severe winters make it necessary to protect thoroughly strawberry vines, and raspberry and blackberry canes, but if they are well covered the plants are safe and the difficulty is completely overcome. A year ago we had a severe winter, and at Sheldon but little snow. Strawberry plants, covered as I had usually done with straw, were somewhat injured. Raspberry tips left in the ground where they had rooted were injured and many of them killed. Gregg raspberry bushes bent down and tips fastened with dirt and with remainder of the canes covered with coarse manure were much injured, while those completely covered with dirt came through in perfect condition. The lesson from these experiences is plain. Give the strawberry vines more covering and the bushes a complete covering of earth. Mulch also when raspberry tips have rooted if you wish them to be entirely safe in our heroic snowless winters.

To my mind a much greater obstacle, especially as regards strawberry culture, is found in the drouths of midsummer and early fall. If we could be sure of three or four good rains in August and the first half of September, when the vines are making or should be making new plants, the prospects for successful strawberry culture would be increased 50 per cent. Only one year in the past four have we had sufficient rain at Sheldon at this time of the year to enable us to secure a good stand of plants. To be sure, thorough, constant cultivation will mitigate the bad results of the drouth, but with almost no rain from July till the ground freezes up, I have found it impossible to cause plants to live and throw out runners sufficient to form a decent matted row, and equally difficult to cause the plants that did form to take root. This condition of things a year ago, when two acres of new planting had made a very poor growth, caused me to decide to leave for a third crop one and a half acres of an old bed that had made a good growth of plants the year before. This was done with a feeling of much uncertainty as to the result, for I had once asked Brother Hinkley if he ever fruited his strawberries a third year. He replied that he had sometimes done so, but had always found afterwards that he had made a mistake in doing so; and then haven't all the authorities told us repeatedly not to fruit a bed more than two years?

The old bed had been mowed closely just after the heavy harvest, and vines and weeds left with the mulch of the winter before. To this was added during the winter strawy manure, a heavy coat of probably twenty-five or thirty big

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loads per acre. The result was that while the new beds yielded only thirty-four bushels per acre the old bed returned 112 bushels per acre, and the fruit was fully equal to that from the new beds. As the newest beds have again made a poor growth the past year, this same old bed will again be given a heavy mulch of coarse manure and left for a fourth crop, though with some misgivings as to the result. I attribute the good crop largely to the heavy mulching which protected them from the severe drought. Given a good stand of young plants and I think the principal secret of success with strawberries in our locality lies in heavy mulching left on late in spring to retard blossoming until late frosts are past, and then partially removed from the plants but left between the rows to conserve moisture.

I have had less experience with raspberries, but believe we shall be able to report good results. Of blackberries I am not so sure, as these summer droughts and hot winds just as they are maturing seem to be very harmful to them, causing the plants to dry up and turn brown before ripening. I have no doubt but that planted in partial shade where protected from the sweeping winds, they may be made to pay even on the prairies of northwestern Iowa. For varieties everyone should test for himself and retain what does best. I have Snyder, Stone's Hardy and Ancient Briton. I see the Snyder recommended everywhere, but with me it has been so far a failure, and unless one more year's test causes me to change my mind, I shall plow them all up. Stone's Hardy and Ancient Briton have done much better, and I have been unable to decide as yet which I prefer.

DISCUSSION.

P. BECHTLE: Some years I have had fair success with old beds. I have always used coarse manure for mulching strawberries. Straw is not enough for our open prairie winters. Some years it will do to leave the mulch on to keep back the blossoms, but when there is a late start the mulch is likely to smother the plants. For a number of years I have found it more profitable to uncover at the beginning of the growing season. I think our failures from frost are less than from any other cause. Last winter my new bed was almost an entire failure, though covered with coarse manure, but the ground was completely dried out. The old beds stood the drouth better than the new ones.

J. A. DEWEY: If you mulch with wheat straw, how many loads to the acre?

H. A. TERRILL: I don't think there is any danger of getting it too thick. I think more and more of mulching heavily, not only for winter protection, but to conserve moisture the next season.

A. T. ALFRED: What would be the result with plenty of snow through the winter without any mulching?

H. A. TERRILL: The danger would be from two causes. In the spring when the snow went off there would be the thawing and freezing again. I use the mulching as much for summer as for winter protection.

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E. REEVES: What is the cost of raising an acre of strawberries until fruiting?

P. BECHTLE: It depends on the amount of cultivation, the season and the man: I think an acre of strawberries costs me $100.

E. REEVES: A successful Illinois grower puts the cost at $60.00, including fertilizing.

H. A. TERRILL: I think that is not far out of the way.

M. E. HINKLEY: How many plants to the acre?

H. A. TERRILL: About 5,000. I mark four feet one way and two feet the other. I plant mostly Warfield, Crescent and Beder Wood.

M. E. HINKLEY: You will notice Mr. Terrill is inclined to be discouraged with blackberries. Do you all agree with him in that?

H. A. TERRILL: I am not discouraged but am not so certain. I should like the experience of others with different varieties. I have two objections to Stone's Hardy. It is a little earlier than others but dries up, is very small, and if the cane is vigorous it breaks more than the Ancient Briton in covering.

P. F. KINNE: What is your plan for covering?

H. A. TERRILL: I use an ordinary spading fork, and with that remove from one side of the hill a forkful of dirt and loosen the dirt with the tines still deeper. I then gather the canes together and bend them toward the excavation. I lay them to the north because the growing canes protect the fruit from the sun the next year.

E. REEVES: Do you try mulching to keep your Snyders from drying up?

H. A. TERRILL: No. I cultivate. A question concerning the sweeping winds. I am exposed on all sides to them. With a small place of thirty acres, would it be advisable to put one-fourth or one-fifth in shelter belts, especially on the south?

E. REEVES: I believe in shelter belts for protecting our farm crops as well as small fruits, but I do not believe in a close hedge. There is a field near my home which for many years was surrounded by a thick hedge of Norway spruce thirty feet high. The place was used for the growing of small fruit. Three years ago it changed hands, and the new owner cut out the trees so as to leave them twenty feet apart, and trimmed up the remaining trees so that there is a circulation of air beneath their foliage. Before this it was almost suffocating inside, but now it is quite comfortable. Yet the force of the wind is broken and there is all the protection needed, and there is at the same time a free circulation of air. That is the kind of protection I advise for small fruit or for farm crops. I think such a protection should be planted over all our fields; but a close, thick hedge I do not recommend even for buildings.

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H. A. TERRILL: What varieties would you plant, to save land and get returns quickly?

E. REEVES: Evergreens will take up less room than deciduous trees. Plant Scotch pine, that is far ahead of anything else for quick growth. A better tree is the Norway spruce. The best tree to plant in a single row is the White pine. The Norway spruce stands next to the Scotch pine as a shelter belt; it is better when it gets its growth and is more lasting. The farmers with us made the mistake of thinking evergreens must be planted four feet apart and about three rows. Now they are planting farther apart; and many are planting twelve feet apart and a single row. This is much better. I should plant at least a rod apart for a shelter belt.

SUCCESS WITH EVERGREENS.

BY W. B. CHAPMAN, CORRECTIONVILLE.

I am glad to say to the residents of prairie homes exposed to the merciless blasts of the north winds that I have been successful with evergreens. But alas for my pride! Generations of Puritan ancestors compel me to tell you that I am only in a slight way responsible for it. To be sure, I have put the trees in the ground, but, like Topsy, "they have simply growed."

If I were asked to explain my success, and give specific instructions to others, I should have to do as did the old colored aunty who was asked by an admiring young housewife for the way she made her peerless cake. "Why its dreffful easy, honey! You jist stir in a little shortening into your flour, put in some sugar till its sweet enough, and a little baking powder, and then mix it all up jist right, and put it in the oven and bake it till its done jist enough, and then you've got it!" And so, my friends, it is with evergreens. You get your trees, get the right kind of soil and location, put them in the ground, take good care of them, and that's all.

But thereby hangs a tale. First in order is the location, and with high bluffs and a large maple grove upon the west and north, my location is practically moved southward many miles, and I am satisfied that this is one of the chief reasons for my success with evergreens. I have gone to the neighboring towns in the spring with wagon loads of evergreens, taken up and handled as carefully as trees could be, sold them to enthusiastic but gullible townspeople, set them out oftentimes myself, only to see them look green and bright for a few weeks, and then, as time went on, to see them begin to turn brown and go the way of all the earth. But at the same time and with much less care I have transplanted trees on the home grounds, practically all of which have done well. Two years ago the hired man, during my absence, transplanted twenty-five Norway spruce, ranging in height from three to ten feet, every one of which is alive and thrifty to-day.

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This has led me to the conclusion that if I were on a treeless farm I would first set out on the north and west of the buildings a grove of the quick-growing deciduous trees, putting them well back from the buildings; then in a few years I would set out a row of Scotch pine, then a row of White pine and Norway spruce, then, here and there, a few specimens of the more tender varieties. By so doing one will be surprised at his success, at the rapidity of growth, and the number of varieties he can successfully grow. In a few years the possessor of such a grove will find that those trees have so entwined themselves about his heart that he would not part with them for all the lauded glories of California.

I will now speak of my mistakes. My chief mistake at the beginning was in putting the trees too close together, a mistake quite common with beginners. I should now put the rows thirty feet apart and the trees not less than twelve feet in the row. Another mistake was in putting different varieties in the same row. They all had an even start, but the quick-growing pines soon outstripped and smothered the slower growing, but more ornamental varieties. It will do thus to mix them if one has the nerve to cut out as the trees become crowded, but I find that a hard thing to do.

I might add in conclusion that another reason for my success is an innate love for trees. Like Sir Walter Scott, I dislike planting corn, oats and potatoes each year only to see them grow, mature, wither and die in a few months. That sort of farming is irksome to me, and my heart is not in it. But, like Scott, I love trees; I love to set them out, watch their growth year after year, and feel that they are not for a few days, but will be a blessing and a comfort to those who do follow after.

DISCUSSION.

E. REEVES: I have never had what you might call poor success with evergreens. I once bought a piece of land, part of which had been farmed for thirty years and some of it was still prairie sod. I broke this up and planted it and some of the old land adjoining to evergreens. I have never been able to get a good stand on the new ground. I think the trouble is, in too many cases, the ground is not properly subdued. Another reason for many failures is exposure of the roots to the air. It is not enough to keep them moist; even if you do that and let them lie about in the air, the sap will set in the trees and nothing can save them after that. The purchaser should take his trees to the ground before unboxing them. Take out a few, put them in the water, and take out one of them at a time when the hole is ready for it. My plan is to cover the roots with loose earth, then shake the tree gently up and down, just enough to settle the earth among the roots. When they are well covered, pack the earth with your feet—you can do it no other way. Fill the hole level, packing the dirt well, and then a little loose dirt on top for mulch. Don't plant an evergreen where corn and potatoes will not grow.

G. H. CUMMINGS: We have in Sioux City four or five acres of Scotch pine, Norway spruce, White pine, Arbor vitæ, Red cedar, etc. Arbor vitæ has proved a failure, killing every few winters and then sprouting

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up again. Scotch pine has given us the greatest success; but if I were planting a grove to enjoy twenty years from now, I would not plant Scotch pine. The older they grow the uglier they become. Our White pines are by the side of the Scotch pines, and patrons always pass them by for the latter. But now the White pine is growing beautiful and symmetrical and is very healthy. When the Scotch pine gets to be twenty-five years old it becomes uncouth; but the White pine, the older it gets the more beautiful it becomes. As to transplanting, take an apple or a cherry tree and plant it by itself and it does very well; but our experience with evergreens is the opposite. If we plant a group of a dozen or more they protect each other.

R. A. LEWIS: The Scotch pine is my favorite tree. I can grow them of most beautiful shape twenty years old. I never cut a limb but pinch off the buds. I like the White pine, in fact, I like any evergreen. I like varieties and have now twenty. I can grow an evergreen just as easily as I can a cottonwood. You must subdue the soil first. The great fault in transplanting is setting them too deep. I can grow evergreens on all kinds of soil and in all manner of places.

E. REEVES: The Scotch pine will make the most rapid growth and with proper pruning—it only requires a little—it will last a long time. If left to itself, in twenty or thirty years it becomes scraggy. I think there are different varieties of seed imported into this country. If you leave out the rapid growth of the Scotch pine, the White pine stands ahead of any evergreen you can plant for beauty; long lived and gaining in beauty as it grows. Austrian pine has been almost cast aside of late years, but about the time the Scotch pine loses its value with ordinary care, the Austrian pine comes on and makes a more beautiful tree than the Scotch pine ever does.

P. F. KINNE: My experience is that evergreens don't need any protection. I lost only two per cent of my trees.

A. J. WESTFALL: Where is the best place to get evergreens?

M. J. WRAGG: Avoid the pineries.

E. REEVES: I never had enough success with forest seedlings to tell the next fall where they had been planted. Of nursery seedlings I have counted a number of rows in the fall and the number of live trees has overrun the count of the nurseryman.

J. A. DEWEY: What size for the farmer?

E. REEVES: Not over two feet high. If I could get a ten-foot tree for the same price as a two-foot tree, I would take the latter.

R. STEELE: What time to plant?

E. REEVES: Just as the buds begin to start. This rule applies to all plants.

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HORTICULTURE PLUS BEE-KEEPING.

BY M. G. BEALS, OTO.

Shall we combine bee-keeping with horticulture? This is a question, the solution of which depends more upon the person, such as natural aptitude for the business, honey flora of his location, etc. Bee-keeping has merits that very few, even of bee-keepers themselves, appreciate. It not only gathers up a most wholesome and nutritious article of food which would otherwise go to waste, so far as man is concerned, but it confers an added benefit which is so great and far-reaching that it is difficult even to compute it. There is nothing more certain than that the productiveness of very many of our most valuable fruits is largely increased by bees in the important work of pollinating flowers. While it is true that other insects assist in this service, we stand in great need of the services of honey bees in pollinating the plum, cherry, and all other early blooming trees and flowers.

That there is an important relation between the bee-keeper and horticulturist, cannot be denied. In view of the above facts, can this be made a paying business in northwestern Iowa? This is a very practical question, as horticulture has already enough of the experimental without adding more. From my experience in apiculture in northwestern Iowa, I should say it can be made to pay; at least half a dozen colonies well managed should supply any family three hundred and sixty-five days in the year with plenty of honey.

To make a success of bee-keeping we must thoroughly acquaint ourselves with the honey flora of our State, which we find much different from that of the country farther east or west. Most sections of the country have their honey crop in the spring or early summer, but ours is mostly gathered in August and September, making it necessary for the apiarist to carry his colonies often through a dearth of honey till July. Hence I would advise that the novice in bee-culture use large and roomy hives and leave them well provisioned for the winter and spring, that they may be able, with plenty of stores, to build up into populous colonies at the commencement of the honey season — a condition that is imperative with successful apiculture. While it is true we are not favored with white clover as a honey plant to any great extent, we have many indigenous honey plants that help to take its place until that time shall arrive when white clover shall be added to our bee pasturage.

In conclusion I would say, if you can adapt yourself to the work by study and observation and learn to do the right thing at the right time, you

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will find bee-keeping and horticulture to go well together; but if you expect to make a success by allowing your bees to take care of themselves, swarm when they please, and abscond to your neighbor's chimney or attic, and in general do as they please, you had better continue to buy your honey and let some other fellow produce it.

DISCUSSION.

R. A. LEWIS: I am very much in favor of bee-culture in connection with horticulture. I have kept bees a great many years, and they don't damage grapes as I have often heard they will do.

MR. BEALS: It has been demonstrated that a bee cannot break the skin of a grape. But the wasp is the great enemy of the grape, especially in a time of dearth of their food. Then sometimes the bees will follow and the mischief is laid to them. People often mistake the wasp for the honey bee.

R. A. LEWIS: If strawberries are left too long before picking, bees will attack them, but hardly ever a sound berry.

H. A. TERRILL: I have a few bees and keep them for the fun of it, mostly. I think they are the friends rather than the enemies of the horticulturist.

P. F. KINNE: One instance where bees have done me good: I have a patch of Miner, Wild Goose and Weaver plums. They never bore a solitary plum until I got some bees, since then I have had good crops.

E. REEVES: A suggestion in regard to white clover. If you wish to get the plant for bees, follow the plan of one of my neighbors with sweet clover. He wanted food for his bees, and carried a pocketful of clover seed and wherever he went, in fields and along roadsides, scattered it, and now he has plenty of food for his bees. If white clover seed were scattered by the roadsides it would be much better for the roads and for the bees.

R. A. LEWIS: White clover kills out too much with us.

MR. BEALS: Like other good things it is traveling west, and I think we will have it in plenty in a few years.

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HOW MUCH HORTICULTURE FOR THE AVERAGE FARMER?

BY A. J. CUSHMAN, MARCUS.

I do not know why I have been selected to furnish a paper on this subject unless it be in accordance with the old proverb, that no man is so good a judge of the fire as he that is burnt. I have been farming in northwestern Iowa for over twenty years, and in that time have found out how little fruit a farmer can get along with, but have not yet arrived at a point where I can say how much horticulture the average farmer can profitably engage in.

The average farmer should at least grow all the fruit that his family can use, and some for his more careless neighbors.

Of apples, which easily stand at the head of the list of fruits, the farmer should at least plant ten trees for each present and prospective member of his family, as the planting of trees is always more or less a matter of providing for future needs. His orchard should have a large proportion of late fall and winter apples, as summer apples come at a time when there is plenty of other fruit.

If the farmer has the time and means at his command, it would pay to plant a much larger orchard, as the towns and villages of northwestern Iowa will probably never be overstocked with good apples.

Of grapes a farmer should plant liberally, as a surplus can easily be disposed of, and it is a fruit that does not draw so heavily on the sugar barrel as some others. I should say at least ten vines to each member of his family should be set out.

Of plums, a half acre or more, would be profitable, especially if set so that the orchard can be opened into the hog pasture. The writer has an acre in wild plums; besides furnishing a large family with all the fruit they can use it buys the sugar for the family, and is worth a large rental as a hog pasture; in fact, I may say it is the most profitable acre on the farm.

Cherries of the hardiest kinds are easily grown; come into bearing quickly, and should be more generally grown. In the farmer's fruit garden they have a liberal amount of ground devoted to them, and there are always corners about garden yards and grounds where an additional cherry tree or two could be planted. Do not be afraid of having a surplus, as the children and birds will look out for that.

While planting trees do not forget the walnut, butternut, hickory, chestnut, mulberry, wild cherry and wild crab, as most of them grow rapidly and make a good windbreak, as well as furnish fruit and nuts.

Of strawberries, raspberries, currants, gooseberries, blackberries, etc., the

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farmer should plant as many at least as his family can use; and they should not only be planted, but be well taken care of.

The most of fruits take but little time and attention at a time when the farmer's attention is needed at other parts of the farm. But the time spent in the orchard and garden is well spent, for nothing, to my mind, serves more to make the farm attractive to old and young than fruits in variety and abundance; and I presume to say that to most people the pleasantest recollections of the old home farm are those connected with the orchard and fruit garden.

DISCUSSION.

PROF. WERNLI: Raise enough for home use, and if you have too much give away or sell. I believe in the diversity of industry on the farm. From the standpoint of health alone it will pay every farmer to raise enough fruit for his family. I would rather eat seven apples than take one pill.

R. STEELE: The average farmer has to depend upon the products of his farm for his living, and a successful farmer is not a successful horticulturist. But few of us have time for fruit culture. The day never comes when there is nothing to do on the farm, and the fruit is allowed to go.

E. REEVES: A good plan is to set aside Saturday afternoon, and instead of going to town, take care of the fruit. That half a day will raise a good garden, and plenty of fruit for the family.

A. T. ALFRED: This is something of a question of dollars and cents, but after all it is more a question of health.

H. A. TERRILL: When a man says he can buy his fruit cheaper than he can raise it I ask him how much money he has put into fruit for his family the past year.

G. H. CUMMINGS: Usually there are but two sides to a question. This has three. Two have been touched upon, the money and the health side. The third is the moral side. The farmer who has a family of boys and girls growing up will have better children if he has fruit trees about him. The boys and girls growing up on a black prairie farm without trees about the place will never be the men and women that they would if their childhood home were surrounded by all kinds of trees. If he never gets an apple or a plum it will still pay to raise the trees.

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PLUM GROWING FOR PROFIT.

BY DONALD HILL, STORM LAKE.

If any apology were needed on my part for attempting to write a paper on plums for market, it would probably be sufficient excuse for me to say that I have had very little experience in marketing plums, but I can tell you what I think I know and you can take it for what it is worth. As to location I would select a north or northwest slope, as near a draw as possible, without getting where it is too wet; plums like a rich moist soil, protected on north and west. Plow the ground deep, mark rows with a plow, rows to be sixteen feet apart, trees twelve feet apart in rows. Get three-year-old trees, mix the varieties, plant a little deeper than they were in the nursery, and mulch well. I have had the best success with trees grafted or budded on plum seedlings. Varieties that have done well with me are Wolf, Wyant, DeSoto, Forest Garden, Hawkeye, Rollingstone, Miner, Early Red, Yellow Voronesh. In marketing, pick the best fruit, pack in quart, peck and half-bushels; stamp your name on every package. The common fruit pack in peck or half-bushel baskets, and sell without stamping name on them. I think you can sell all the fruit you can raise at good prices. I have a plum orchard of two hundred trees, twenty or more varieties; twelve varieties have fruited, and I think I will have plenty of plums to sell in the near future. I aim to cultivate the home market first, and have a ready sale for all the plums I have to spare.

DISCUSSION.

MR. CUSHMAN: I have only the native wild plum, about an acre in all, and have great quantities of plums nearly every year. I have picked them in August and the 11th of November. I turn the hogs in after we are done and they have a rich feast. I have no trouble to raise plums unless a late frost comes.

R. A. LEWIS: I have one plum tree that supplies all two families need.

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EVENING SESSION--TUESDAY.

The evening session was held in the opera house. Opened with prayer by Rev. J. C. Snowden, followed by an address of welcome by the mayor, P. F. D. Alwin, which was responded to on behalf of the society by J. A. Dewey. The exercises of the evening were greatly enlivened by music furnisned by the orchestra and male quartette.

PRESIDENT'S ADDRESS.

BY M. E. HINKLEY, MARCUS.

The Northwestern Iowa Horticultural Society is to be congratulated upon its favorable prospects.

Our organization completes a quartette of societies auxiliary to our State Horticultural Society. Through the good graces of the State society, and as a part of its work, our financial needs are provided for. The appropriation of $150.00 annually for our use gives us an equal standing with the other subordinate organizations. This sum, augmented by our annual membership fees, insures a fund sufficient, with prudent management, to carry on the society from year to year. But important as is this financial consideration, it is not the best thing to be said. The best fact is that we have in our district, embracing twenty-four counties, a large number of intelligent, practical men who earnestly desire to succeed in horticultural work.

These men are alive to the movements of the age, and they have had an experience in our northwest which makes such comparison of notes and interchange of ideas as this meeting provides for, extremely valuable.

Again, we are fortunate in having such close relations to a State society which takes very high rank among the horticultural organizations of this nation. The Iowa Horticultural Society ranks high because it counts among its members some of the most energetic and successful experimenters in this line to be found anywhere. The circumstances of life have placed us near the present northern border of orcharding. We have here the heroic stimulus of difficulty. Nature does not smile kindly upon our efforts to induce her to yield her daintiest treasures. And all the more honorable will be the triumph of Anglo Saxon skill and industry over the obstacles of a rigorous and variable climate.

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Horticulture in Iowa is a department of human work a step in advance of agriculture. It is like the superstructure to the foundation, or perhaps better, it is like the finishing to the superstructure. Horticulture under difficulties encourages study and research. It leads to the investigation of climatic problems. It is an open door to the sciences of botany and geology. This is true because to answer the practical questions which arise in horticulture, we must study its relation to those sciences. Success in horticulture and the financial profit which can only come through success, are dependent upon a careful study of conditions in connection with the lessons of experience. It is to promote such study and to collect and record such lessons that our organization exists.

Let us, in pursuing this work, meet the future without over-confidence and without misgivings.

Much of our experience has been discouraging, yet we must not be discouraged. We have had transient success, yet they should not blind us to the persistent hostilities of our continental climate.

We should have hope from the fact that as the years go by we are making progress.

While the philanthropist will rejoice that our work tends to make life easier and happier for the next generation, the practical man of the day may be glad in the fact that it promises wonders for the present generation.

Our horizon is enlarging and we need to be on the alert to the trumpet calls of progress.

Every branch of human labor and every line of scientific investigation feels the quickening influence of this electric age. And horticulture is not lagging behind in the race to the goal of perfection. It is not too much to say that our advanced horticulture has become a creation. Or, we may better say, a continuation of creation along scientific lines.

In these days we find a wider, deeper meaning in man's commission to "subdue the earth," than our fathers dreamed of.

By skillful co-operation horticulture proposes to effectually aid nature to do her best for man. The blind processes of nature in a few thousand years have produced some excellent fruits even for cold climates.

But nature's operations have been tedious and aimless, like rowing a boat with one oar. Now man, gifted with the divine power of thought, seeks to be eyes to the blind, fixes a definite aim, and puts in the other oar. Originating new varieties of fruits with foreordained qualities is a fact of the immediate future.

The art of intelligent cross-fertilization is now practically applied. Magical results have been obtained already, but we are only at the beginning. We have more than one Aladdin now busy in this field of enchantment. Of course, in this line of work reasonable time must be allowed. But in spite of the difficulties of a new art, victory is surely coming. All the evidence points to the conclusion, that what has been accomplished is but a foregleam of what is probable in the future. The careful student of the results of recent experiments is readily convinced that the time is not far distant when we shall have a race of hardy fruits, skillfully bred to suit the requirements of our climate.

It is within the province of this society, not only to spread the news of horticultural progress, but to aid in the dissemination of new and valuable fruits. We are to break the bread of this new life, to a waiting and hungry public. We may so manage the work of our organization that every intelligent tiller of the soil in this northwest will yet thank us, acknowledging a debt of gratitude.

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This is our second annual meeting and it might almost be called our first regular meeting. Our gathering at Cherokee a year since was largely an experiment. But our society being now successfully launched, plans for its best use, for its greatest attainable enlargement and success, will materially command your thoughtful attention.

As timely suggestions let me offer the following:

1. In selecting the place of meeting from year to year, a point to be considered is this: To insure a good attendance we must have a pronounced local interest in horticulture. Ease of access from all parts of the district is quite important, but without considerable local interest, we can hardly have very successful meetings.

2. Sending delegates to our sister societies in the State is a very proper way of increasing interest in horticultural work.

In many cases proper delegates could be obtained if the society would pay half of the expenses. I should favor a by-law establishing the rule of sending delegates, but leaving their selection to the executive committee.

3. Efforts should be made to secure the participation of ladies in our annual program. There is no surer way of arousing and maintaining a local interest in our meetings. We all know that the ladies have a neat, sweet and complete way of accomplishing what they undertake, which is so very captivating. By all means let us find the ladies who are interested in gardening and floriculture and secure their counsel and help.

4. Our premium list should be made as liberal as possible. Nothing can be more valuable in our annual meetings than the object lesson of the fruit actually produced. And to secure this object lesson, premiums should be offered large enough at least to cover the actual cost of making an exhibit.

5. A press committee should be appointed to secure the publication of our proceedings in the leading papers of the district. It is perhaps too much to ask the Secretary to do this, and it could be more easily done by prominent horticulturists in the vicinity of the papers to be used. It would be a great point gained if we could maintain a horticultural column in a half dozen of the leading papers of our territory.

6. At this early stage in our history much good could be done by an exploring committee. Its duty would be to look up the principal orchards of the district, and report next winter, on soil, culture, varieties and yield. In connection with this work could easily be made a list of our leading fruit growers. Such a list should be kept in the Secretary's office, and would aid him in the proper distribution of circulars. It would help to develop an interest, and a mutual wider acquaintance, tending to draw many practical men into our society. One man in each county could probably be found to make such a report.

Perhaps the society would not wish to incur expense in this direction, but much of the work could, and would be done by volunteers. It only needs that the need should be recognized, the idea developed, and the committee appointed.

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EXPERIENCE WITH FRUITS IN BUENA VISTA COUNTY.

BY P. F. KINNE, STORM LAKE.

In the winter of 1880 I commenced on my present place by moving a Richmond cherry from my village lot in Storm Lake. The ground was frozen about eighteen inches and the tree had been set fourteen years at which time I had set the lot to Hyslop, Transcendent, Soulard and a variety of small fruit. By the way, at that time I was in the ranks of the doubters on the apple for northwestern Iowa, but I pinned my faith on Hyslop and Transcendent. To-day there remains of that setting the Soulard only. The Richmond that were left long since went where the woodbine twineth. The Richmond I moved in the winter survived till the cyclone of last July, when it made a visit to my nearest neighbor one-half a mile east.

In the spring of 1881 I set about 300 trees, apple, plum, cherry, pear, etc. In apples Oldenburg, Red June, Ben Davis, Haas, Alexander, Whitney No. 20, Genet, Wealthy, Golden Russet, Perry Russet and Utter's Red, at that time considered a good list. Of these now remain Oldenburg and Haas in good condition, Wealthy, Whitney, Perry Russet, in fair condition; Utter's Red and one Genet, fairly good. When the wholesale destruction of trees occurred in 1885, I straddled the seedling hobby, and myself and a neighbor, Mr. Clemons, bought out an old nursery of seedling trees and set about 600 three to five year old trees. A large percentage of these trees grew and promised well, but out of the lot not to exceed a dozen proved to be of any value in tree or fruit. One plain object lesson stands at this point clearly defined. Had I planted all of these two settings of Oldenburg I should have had much less experience, but should have been jingling a good many big round dollars in my pocket to-day, in lieu of the good many I planted in mother earth. About 1883 I began planting Russians, and were it not for that fiend blight I should now be out of the wilderness, but it seems as if my way to flowery beds of ease was not yet to be. I began to be rewarded by the taste of an occasional apple, and each one was surrounded by a halo of satisfaction about the size of a wagon wheel which fired my flagging energies and spurred me on in hopes of better things. It seemed as if I could see in the distant vista an elysium filled with red and golden apples that would neither blight nor winter kill. I began to get off the seedling horse, and my observations led me to think the only way out of the woods was to follow the by-ways fashioned by Prof. Budd. While I have raised many bushels of apples yet the fact stands forth prominently that from the old list there stands but one sure thing to plant, and that is Oldenburg. Just that one tree that a planter in Buena Vista county could plant and say in

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ten years I shall have a perfect tree. From among the Russians a number stand out without failure so far, Hibernal, 262, 169, 379, 1277, 282.

From among the cherries again it seems as if Prof. Budd holds the straw at which we all must grasp, and in this field there is much encouragement. Following the moving of the Richmond cherry in the spring I planted Early and Late Richmond and Morello. The Richmond stepped down and out after a couple of partial crops. Morello none. Richmond grafted on Miner have borne regular crops and proven to outlast those on cherry stock. Dyehouse, Montmorency, Wragg, Brusseler Braune, Wier, Skeanka, Geo. Glass, Lutovka, Bessarabian, Spate Amarelle, and a number of Orels, are all looking well. A portion of them bore a partial crop the past season, and I feel that with this list before him the planter for the northwest need not hesitate to push forward and plant this most appetizing fruit with every prospect of success. New foes may arise, but new weapons will be forthcoming to fight them with. The possibilities of this country are enormous, and as I look out across these broad prairies and think what a few dollars intelligently used may make of it, it seems as if there ought to be some lever to shake up the apathy of our people and make of our country a veritable garden of Eden.

In my first planting I put out in plums Miner, Wild Goose and Weaver; the Wild Goose was soon a thing of the past, and I had no returns from Miner and Weaver until the country became stocked with bees, for the reason that I had planted them in too isolated a manner. When I began to plant closer and intermingled varieties there was no failure of plums. Ours is a plum country. There has never been any question in regard to this fruit for the northwest with such varieties as Wolf, De Soto, Wyant, Cheney, Rollingstone and Rockford among the natives, and Early Red, Moldavka, White Nicholas and many other varieties among the Russians, we need have no fear of even our California friends, and need not take a back seat for any one on this most delicious fruit. In small fruit we have but to plant and intelligently cultivate and we surely reap our reward. My first venture in strawberries was bought of our worthy president—Crescent, fertilized with Capt. Jack. My greatest yield has been 225 bushels per acre, and that ought to satisfy even a hungry man. One thing must be constantly borne in mind, and that is that eternal vigilance is the price of fruit; add to this judgment and plenty of elbow grease well directed, and our northwestern district may be made the envy of all and the pride of our beautiful State.

HORTICULTURAL LESSONS OF TWENTY YEARS.

BY R. A. LEWIS, CHEROKEE.

The few following questions are founded on experience: First of all I have learned this, that we must cultivate a spirit of persistence. If we fail at one point, take up another position and try again, and take a lesson from our failure. If,

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after a storm, such as we all have experienced, we find our favorite row, screen, orchard or ornamental plant of trees blown here and there, some torn out, some whipped about, some leaning this way, and some that way, do not say on first thought, "This is enough," then hitch up the team and plow the whole business up and plant corn.

Instead of this go quietly to work; with care straighten up, put in place, replant, stake and tie if necessary.

You will find that the storm has actually been a benefit, instead of destruction, as you first thought.

Twenty one years ago last June I commenced at Cherokee the growing of trees and plants with the idea of making it a success. One of the first lessons that I learned was partial failure on account of ignorance. I became convinced that the soil must be thoroughly subdued in order to make the growing of trees a success. Then I consider that most all varieties of trees when planted by nature were protected and mulched with leaves, boughs, etc., especially is this true of evergreens. From this time on I was very careful to assist nature, and this was an important lesson for me. Hence I was careful to see that the ground was well prepared for what I wanted to use it for.

Of course to grow native trees requires but little experience. I find the best way to plant black walnut is to plant the seed where you want them to grow permanently.

To grow evergreens from seed requires experience, patience and care. Comparatively few make this a success. After taking the young plants from the seed beds and replanting I again shade and mulch for two or three years before planting in open ground.

Again, I find not a few trees meet their fate by being planted too deep. I have found when replacing trees that have died that there were some of them planted 8 to 12 inches too deep, and besides this there had been piled up a mound of dirt around the tree 6 to 10 inches, causing the tree to die. I concluded that more trees die from deep than shallow planting.

I have adopted, as a rule, thus: Whenever replanting trees from nurseries plant for each foot in heighth one-half inch deeper than they were in nursery, also in planting the large trees I leave the surface lower at the tree so as to get the advantage of the rainfall.

In fruit tree planting the location is a very important factor in the future of your orchard. Never select a south slope if it can be possibly avoided. If you are obliged to use a south slope use a good windbreak so as to protect it from the hot winds. Next to the south avoid the west. Some may ask why. My reason is this. The hot rays of the afternoon sun warm the buds and bark, by sunset or soon after follows the sudden cold change which is very damaging to tree and fruit. Next to west is east. There is not so much objection to east as west; the forenoon sun of course warms to some extent, but as the sun passes around the reaction is comparatively slow and by night it is ready for the cold air.

Of course this leaves the north as first choice, as it is less affected by the sun's rays and the hot winds.

Next comes the preparing of the ground which should be done the year before. I believe the best crop to get the land in readiness is corn or potatoes; always plow in fall, never in spring. Next select your trees with care. If your judgment is good then use it, if not seek the advice of some one that you know is qualified to give you the proper information as to varieties as well as size and quality.

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Next comes the handling and preparing for planting. Of course keep the roots from winds and sun as much as possible; prune off all damaged roots, cutting from lower side. Next plant with care, keeping roots in as near same position as they were when the tree was taken from the nursery. Never use water when planting; if roots are dry, puddle or wet before planting. After planting and mulching then use abundance of water. Leave the tree leaning a trifle to the 2 o'clock sun so that the top will shade the trunk of the tree.

I have tried different kinds of forest trees and conclude that the ash, black walnut, honey locust, maple and black cherry are as good a selection as can be used as they are all valuable for timber. Also red cedar and white pine are valuable for timber and do remarkably well here. Use red and white cedar, spruce, white pine, balsam fir and Austrian pine for ornamental trees. Some may say why use the Austrian pine for an ornamental tree? We see but little beauty about it for the first twelve or fifteen years, after that it becomes more and more stately and its dark foliage is magnificent. The Scotch pine is most valuable for wind-breaks; the spruce and balsam fir for ornamental rows.

Wind-breaks are one of my pet experiments and I will give here what I consider a model wind-break. First plant a row of the old reliable Scotch pine, twenty feet in row, selecting those with a dense foliage. Next plant twelve feet from this a row of white pine ten feet in row. Next plant ten feet from this a row of spruce ten feet in row; then eight feet from the last row plant a row of red cedar ten feet in row. This makes thirty feet and makes a perfect wind-break and an ornament to every place. I am confident that any person planting a strip like this will feel amply paid for the expense, and would not at any price have it removed.

Finally, friends, when I contemplate the satisfaction, the comfort, the pleasure, the value and appearance of these blessings, with so little effort on our part to obtain them, I am surprised that so few avail themselves of these comforts and pleasures.

A GLANCE AHEAD.

BY PROF. J. WERNLI, LE MARS.

We live in the far northwest, in a country which was described by the hunters as the paradise of the buffalo, the elk and the deer, and by the missionaries as a cold, waste, treeless plain, full of endless hardships and without a hope of prosperity. Forty years ago this section was the undisputed hunting ground of the Indian. Even the emigrant wagon to the gold-fields of California took a more southern road. The hard winter with its blizzards, and the hot summer with its dry southern winds, seemed to make this country irredeemable to culture, and unfit as a dwelling place of civilized people. Now witness the change. See the fields of corn, boundless, stretching their rows east and west, and north and south. See the State of Iowa, the queen of the corn king in the United States, and Plymouth county, with its glorious

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northwestern neighbors at the head of the rank and file. See the fine farms, the beautiful groves, the thrifty orchards, the inviting gardens, and the spacious, well built farm-houses and barns. Even the fashions of New York and Paris are at home here, and are prospering in the former desert.

You ask me, what will the future be? We need another mirror. The Roman Emperor Julius wrote glowing descriptions of the terrible country across the Alps and the Rhine, of the endless forests, the boundless swamps, the inaccessible mountains, the never-ending winters, and of a clime that could be endured only by the sturdy oak, the tall birch and beech, and the lofty pine, the wild boar, and the savage German and Anglo-Saxon.

See the change now. Is there a finer, more diversified landscape, covered with cities and villages, with rich fields, immense fruit trees, extensive vineyards, and all the delicious fruits we are so much longing for?

Then the crab-apple was stored away for winter use; now apples are so plenty that in those prosperous countries they are sold by the car-loads for less than 80 cents per hundred weight. The little wild pear was gathered, a pear of the size of wild plums, and eaten when ready to decay, and now the pear trees are as numerous there as here, the box elder, reaching a height of 40 to 60 feet and a circumference of from 5 to 10 feet and more, and the pears are sold at a rate of from $1 to $2 per cwt. The cherry trees line the highways and the creeks, and their fruit is not only very tempting but also very cheap. The same is true in regard to plums and prunes, vegetables and grapes. These changes were not effected by the time of 1800, but during about 200 to 300 years, and began during a time when books were very rare; agricultural and horticultural papers unknown; the railroad not dreamed of; farmers' and horticulturists' conventions impossibilities, and a new invention in agriculture or horticulture kept a secret by the greedy inventor, that could be obtained only by a large sum of money. And yet the light dispersed the darkness, knowledge spread far and wide, and we now try to grow the fruits of France, Germany, Switzerland and cold Russia, and many doubt of success.

Do we not claim for us a better soil than that of Europe? Have we not the climate of eastern Europe with American enterprise, and the knowledge of the whole world? Is not the experience of our skilled nurserymen and horticulturists at our service? Do we not get access to their deliberations and their discussions? Can we not obtain the observations, the trials, the successes and the disappointments of the leading horticulturists of the State of Iowa during the period of one year, in a nicely bound volume of about 500 or 600 pages at the price of one dollar, or by becoming members of this horticultural association?

Well then, what can I see in the near future? Supported by the progress of the past in America and Europe, and the unsurpassed facilities and agencies of the present, a most pleasant picture appears before us.

If we glance ahead to the year 1909, what a change will be found in northwestern Iowa! The whole distance from Sioux City to Merrill, on both sides of the track, is covered with blooming fruit trees; the farms are closer together. Every farm of not more than eighty to one hundred and sixty acres has an orchard of two to three acres, and a flower and vegetable garden of at least one acre, containing also the different kinds of small fruits, as currants, grapes, raspberries, etc. The highways are lined with

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blooming fruit trees. The farm-houses are cozily nestled among the fine trees and shrubbery. The wand of a wizard seems to have changed the whole county, and indeed the whole northwest of Iowa, into a blooming garden.

Upon inquiry I learn that the commencement of the present transformation dates back to the 12th and 13th of December, 1893, when the Northwestern Horticultural Society held their second annual meeting at Le Mars, and there, by their instruction, deliberations, and enthusiasm for tree culture, induced hundreds of people to join the society. The annual reports, published by the State, were given free of charge to the members. These books had a wonderful influence upon the people. They created a thirst for more information. A county horticultural society was organized in every county of northwestern Iowa; a monthly periodical, *The Northwestern Horticulturist*, was founded, and horticultural schools of from four to eight weeks, with itinerant teachers, paid by the State and educated at the Horticultural College at Ames, were established, disseminating knowledge and creating love for horticulture.

Such a change can be produced in a brief period of time by a people as intelligent, energetic and free from prejudice as ours. We have the enterprising people of America and Europe. The weak, the lazy and the timid stayed on the old homesteads among the cliffs, the hills, the rocks and rills.

MORNING SESSION—WEDNESDAY.

GENERAL ORCHARDING.

BY W. T. WORTH, CLIMBING HILL.

Location.—On a hilly or undulating farm. I consider this "half the battle," and here is where the great mistakes are mostly made. Most people think they want a warm or sheltered position, and plant their trees on low ground or land sloping to the south. Select the highest ground, even if it be farther from the house, making the southwest corner of the orchard on the highest point of the hill with the bulk of the trees extending down the north and east slopes.

Preparation of the ground.—Plow the ground in the fall if possible, if not, plow early in the spring and harrow at once. Get the trees in the fall, thrifty two or three years old, but don't buy them of a stranger, no matter how fluently he talks, nor how nicely his pictures appear. Go to the nearest good nursery for your trees or send to some nurseryman who has a good reputation, and if the nursery is somewhat south of your location, say from one to three hundred miles, the trees will most likely be all right. If you don't get your trees in the fall get them as early in the spring as you can and "heel them in," that is, bury them in moist

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earth, covering the tops also with three or four inches of damp dirt. Let them remain there at least two weeks if convenient. Select cloudy, damp weather for transplanting them; plant in rows, running north and south, fourteen to fifteen feet apart; the rows the other way being twenty-eight to thirty feet apart; this will let in the sun and air on two sides of the trees and give room to cultivate corn or other crops for several years and when the trees are large you can drive through the rows one way with a wagon.

VARIETIES.

Here is where we come to deep water. For the northwestern part of Iowa we have not found a first-class apple in quality, size and color, that will keep all winter, a perfect "iron-clad," and bear yearly good crops. There are plenty of summer and fall apples, and some good winter apples, but small. It is safe to plant the Oldenburg, Wealthy, Yellow Transparent, Longfield and several other Russians. Before setting the trees cut off the bruised roots smoothly. set a little deeper than they stood in the nursery, straighten out the roots, fill in with fine dirt, and when the roots are well covered tramp the dirt in solidly, then throw a little dirt on loosely; lean a little toward the two o'clock sun. In this breezy northwest allow the branches to come out as low down as possible on the south side, and do but very little trimming thereafter, although your neighbors will frequently advise you to trim your trees. Let cherry trees limb down to the ground, and never prune any. I used to trim trees so I could walk under the limbs—they looked so nice—but I don't do so any more. The next thing is cultivation, and don't forget it. It pays big to cultivate your orchard thoroughly the first year, and also for several years to come. Never sow small grain in the orchard unless it be buckwheat.

DISCUSSION.

R. A. LEWIS: I plant small fruits among the apple trees.

M. E. HINKLEY: I learned long ago that the only way to success in the northwest was to mulch heavily. I have raised corn between the rows, but not very close to the trees.

H. A. TERRILL: How long do you keep up mulching?

M. E. HINKLEY: Until the trees come into bearing.

MR. WOODS: How long would you cultivate trees in the summer?

M. E. HINKLEY: During the growing season.

M. J. WRAGG: For blight we cut it out and burn it up. We have tried patent concerns and spraying emulsions, but they do no good. Trees well cultivated, with good air-drainage, seldom blight.

MR. WOODS: Does blight affect all varieties?

M. J. WRAGG: Yes; even the Oldenburg.

M. E. HINKLEY: Blight is perplexing. I cut it all out three years ago, but last year everything blighted, even the Oldenburg.

A. J. WESTFALL: I should like the opinion of the society on pruning.

H. A. TERRILL: I prune but little in this locality.

S. R. SIPMA: I have Oldenburg and Wealthy sixteen years old and have never pruned them. I think that is the best way. The trees need protection from the sun.

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M. E. HINKLEY: Are your Wealthy as healthy as the Oldenburg?

S. R. SIPMA: No; the Oldenburg takes the lead.

J. S. HAAG: I trim bu tvery little, and only on the north side, to keep the tree from leaning that way.

D. HILL: That is the only pruning I do.

G. WETMORE: I have always pruned my trees very heavily. They were healthy until they began to bear, and then they began to fail. I have thought perhaps it was due to heavy pruning.

GROWING OF THE CHERRY.

BY M. J. WRAGG, WAUKEE.

Next to the apple the cherry comes as a fruit that contains more good points both as a commercial and culinary fruit. For the past twenty years cherry growing has been discouraged in the north and northwest by horticulturists, thinking them too tender in bud to endure our reverses of temperature, moisture and drought. But experience has taught us that many of the cherries of high quality can be grown almost to perfection in the northwestern quarter of Iowa. During the past two years the best specimens of cherry I have seen came from Woodbury and Plymouth counties.

I am of the opinion that many of the Griotte family of cherries will do well clear up to the State line. The Wragg cherry will be found a valuable sort to plant on the loess soil clear up to Sioux City, and on its own roots will go a degree farther. The Early Richmond will pay to plant on high dry ground as far north as LeMars, and west of the divide; yet it will be a short lived tree, but I think it will pay.

The Brusseler Braune and Bessarabian are going to prove valuable cherries to plant any place west of Des Moines river up to Minnesota on moderately dry ground.

The question of stocks for the cherry is one of the prime factors to be discussed and settled at this or future meetings. The commercial stock of to-day used for most varieties is Mahaleb. For all light juiced cherries they do fairly well, but in no case make a long lived tree without being planted very deep, and eventually get on their own roots. But for the colored juiced cherries we must find some more congenial stock. We had great hopes of the Sand cherry as a stock, but after two years' trying we will have to discard it, yet it will prove valuable for plum, I am sure.

DISCUSSION.

M. J. WRAGG: *Prunus pumila* is a good stock for the plum, but not for the cherry. I have great faith in *Prunus Pennsylvanica* as a stock for the cherry. We have tried it for three years, and I think we

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are going to find our future hardy cherry stock in that little red bird cherry. We must do that or else grow our cherries on their own roots.

H. A. TERRILL: Do all varieties of the cherry unite well with that stock so far as you know?

M. J. WRAGG: So far as we have tested. We have tried probably thirty varieties.

PROF. WERNLI: I sent to my brother in Switzerland for grafts, sacrificed five or six Chickasaw plum trees and grafted on the branches three or four different kinds of cherries. I also grafted several choke-cherry trees. They are doing well.

P. BECHTLE: Prof. Wernli's scions have made fine, vigorous growth. The only objection I see is that the scions overgrow the stock. Perhaps in future years they would overgrow so much as to be useless. The choke-cherry is perfectly hardy but of slower growth. In nursery propagation I think it useless for this reason.

THE USE OF THE SAND CHERRY FOR STOCKS.

BY PROF. J. L. BUDD, AMES.

During the past few years the use of the Sand cherry (*Prunus pumila*) as a stock for the cherry and plum, has been much discussed, but as yet we have no convincing experience favorable to its use in cherry propagation. But in Utah, and in various parts of the prairie states, we have plum trees on this stock of several years' growth, which favor the belief that our cultivated varieties will unite perfectly with its wood, come into bearing earlier, and become dwarfed in size of tree.

With a view to more exact conclusions we grew, in 1892, about five thousand stocks from seed gathered in northwest Nebraska. The seed was washed from the pulp, dried for three or four days in the shade, mixed with sand in boxes, and put out for winter freezing. The seedlings made a fine stand and their growth the first season was about equal in height and diameter of stem to our seedlings of native plum. In the fall of 1892 we took up the largest of the seedlings for crown-grafting, leaving the others for budding.

RESULTS OF CROWN-GRAFTING.

PLUM.

Long Blue. (No. 20 Vor.) Russian. Of 75 side-grafts, 50 grew, or 66.6 per cent. Growth poor and slender, compared with those worked on native plum roots. Height, from 7 to 16 inches, branched; average, 10 inches.

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Wyant. Native (*Prunus Americana*). Of 290 side-grafts, 120 grew, or 41 per cent., about as thrifty as those on native plum roots. Height, 7 to 34 inches; average, about 18 inches.

Pottawattamie. Native (*Prunus Chicasa*). Of 194 side-grafts, 68 grew, or 32 per cent. Height, 10 to 28 inches, averaging about 18 inches; strongly branched.

Ogon. Japanese. Of 79 whip-grafts, 31 grew or 39 per cent. Height, 8 to 21 inches, averaging about 12 inches.

Of 79 side-grafts, 43 grew or 54 per cent. Tallest, 23 inches; average, about 16 inches, branched.

Early Red. Russian. Of 390 whip-grafts, 190 grew or 48.7 per cent. Height, 7 to 27 inches; average, about 12 inches, much branched.

Of 427 side-grafts, 293 grew or 68.6 per cent. Average height, 12 inches, much branched.

The relative growth when side-grafted and whip-grafted agrees with our former experience in grafting the stone fruits.

PEACH.

Of 56 side-grafts of Bokara peach on this stock, but one grew. Height, 10 inches.

CHERRY.

Bessarabian. Of 335 side-grafts, only three grew. Average height, 12 inches.

Strauss Weichsel. Of 260 side-grafts, only one grew. Height, 11 inches.

Lutovka. Of 152 side-grafts, only one grew. Height, 16 inches.

Brusseler Braune. Of 255 side-grafts, all failed.

SUMMARY.

As our crown-grafts of cherry on Mazzard gave an unusually good stand the past year, and also our plum grafts on native stocks gave a good stand, we may conclude that the Sand cherry is not a desirable stock, or else it needs special management and treatment which we do not as yet understand. This may easily be possible as our prior experience in budding the Sand cherry was not a success, while this year it was good for the reason, perhaps, that we budded earlier in the season.

RESULTS OF BUDDING.

PLUMS.

Early Red. Russian. We began budding Sand cherry stocks July 15. Of 130 buds inserted, 14 failed to unite. In this case the budding was done too early. Seven of the buds started growth. The stock was cut off above one of the buds and it attained a height of 10 inches. The starting buds on those not cut off merely formed a tuft of leaves, or made a growth of from 2½ to 11 inches; average, 5 inches. We found it necessary to cut the second tying, and when examined October 11, the growth had extended on both sides of the shield, showing considerable increase in size of stem after the bud was inserted.

Richland. European. Of 143 buds, inserted July 17, only four failed to unite.

Leipsic. (No. 113 Riga.) Russian. Of 47 buds inserted July 22, all united.

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Minnesota. A Swedish variety from Minnesota. Eighty-one buds inserted July 18. All united.

Trabesche. Russian. Thirty buds inserted July 22. All united. One of these started and made a growth of 15 inches, without cutting off the stock.

Ungarish Prune. Imported from Russia. Of 247 buds inserted July 17, three failed to unite.

Botankin. Japanese. Of 183 buds inserted July 17, nine failed to unite. Eleven of the buds started growth. In two cases the stocks were cut off just above the bud, August 5; one made a growth of 15 inches, the other 4 inches. The stocks of the remaining seven were not cut off, and the buds made an average growth of 3.6 inches.

Burbank. Japanese. Of 164 buds inserted July 20, two failed to unite. Fifty-nine of the buds started growth. The stocks of 22 of these were cut off just above the bud, August 5, and the buds made an average growth of 4.6 inches. The stocks of the remaining 37 buds were not cut off, and the buds made an average growth of 10.22 inches. The excitability of the buds of these two Japan plums is worthy of note.

Wyant. Native. (*Prunus Americana.*) Of 487 buds inserted July 19, two failed to unite. The union seems better than with any of the European plums.

AUGUST BUDDING.

The sprouts that came up from the stocks where the root-graft failed, were budded about the middle of August. Buds of Trabesche, De Soto, Wolf, Milton and other sorts were inserted and have made a good stand. This late budding is suggestive, as the sprouts were all of this season's growth and were in an excitable growthy condition when the bark on last season's wood would not raise.

CHERRIES.

Bessarabian. Of 194 buds inserted July 21, nine failed to unite. Seven of the buds started but made no extension of growth. The union is not perfect, the edges of the shield being inclined to roll back.

Sklanka. Of 262 buds inserted July 21, ten failed to unite. The edges of the shield roll back less than with Bessarabian.

Yellow Glass. Of 54 buds inserted July 22, all united. A good union, appearing to indicate that the sweet cherries will make the best union with this stock.

Shubianca. (6 M.) Of 143 buds inserted July 22, only one failed to unite. Union good.

Shubianca. (6 M.) Of 107 buds inserted July 24, three failed to unite. Union good.

Early Morello. (No. 23 Orel.) Of 146 buds inserted July 24, three failed to unite. Union good.

The Sand cherry stock is not as favorable for rapid work as the Mahaleb on account of its numerous branches close to the ground. As it is a surface rooter, the remedy of low budding is not practicable.

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THE BENEFICENT INFLUENCE OF HORTICULTURE.

BY J. A. DEWEY, KINGSLEY.

As this society was formed more especially for the promulgation and diffusion of knowledge concerning fruit and fruit culture, I will endeavor to confine this paper almost exclusively to *that* particular branch of horticulture and its influence on mankind.

If you will follow history down through the lapse of ages to the present time you will find, other things being equal, that those nations, tribes and individuals who gave the most attention to horticulture were the most enlightened and made the greatest strides in science, literature and moral and spiritual advancement.

Take, for instance, Noah, who planted a vineyard after the deluge. The ancient Egyptians, who planted their gardens before the time of the exodus of the Israelites; the Babylonians, the Persians, the Chinese, famous for their dwarfed trees, as well as the inhabitants of India. Look at Greece in her halcyon days. We find her reveling in the cultivation of the far-famed fig of Attica, the sweet and luscious grape from off the shores of the Gulf of Corinth, as well as in Arcadia and the west coast of the Peloponius, to say nothing about the famous vineyards on the island of Santorian that furnished the sparkling wine that softened the heart of the hardy Russian.

In 1492 when Columbus discovered Hayti, he found the natives mild and peaceful, living chiefly on fish, bananas, cassava bread and native fruits. This was quite contrary to representations and fears of the captives Columbus had secured from Cuba, who could hardly be persuaded that this was not the land of cannibals, of dog-headed men, of cyclops and other monstrosities.

It was found upon landing that the country was well cultivated, and the roads connecting the villages were in good condition, so that with orchards, gardens, fields of grain and houses of fair construction, there were abundant evidences attesting the great superiority of these natives over their Cuban neighbors. Notwithstanding the timidity exhibited by the natives when Columbus and his followers first landed, by means of the same treachery and cunning employed when on the island of Cuba, Columbus possessed himself of one of these peaceful islanders, the wife of a native who lived some fifteen miles in the interior, where more striking evidence of the beneficent influence of horticulture presented itself.

These treacherous and covetous Spaniards soon ingratiated themselves into the confidence of these simple minded and confiding people, who vied with each other in their endeavors to entertain their strange guests. Their manner of life was innocent in the highest degree, as during the whole time the Spaniards spent among the natives, not a single act of violence or treachery was observed. It was evident that there was a confraternity of interest among them, since each was

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willing to share with his neighbor whatever he had, exacting no equivalent, and in all respects exhibiting by word and deed, a common brotherhood not found existing among so-called Christian people.

Increase of wealth and political power does not necessarily imply proportional increase of moral and spiritual growth, as the downfall of several rich and opulent, but wicked, governments and cities attest. As a rule, show me a people who feast upon meat at the exclusion of fruits and vegetables, and I will show you a despotic government with a cruel, warlike and savage people. On the other hand, point out to me individuals, tribes or a country where its people subsist principally on fruits and vegetables, and I will show you a peaceful, contented, happy, as well as healthful people, who are living more in accordance with the principles laid down by Christ than with those of Moses.

I know it will be held by some that meat is an essential element of food for man, especially the laborer, but I contend that this cannot be maintained in the light of existing facts. Look at the Italian laborers, often working unceasingly through the heat of the day and flourishing on a diet of black bread and olives. The Scotchman's oatmeal is often his only food, and his hardiness, endurance and courage are proverbial.

I might carry these illustrations on indefinitely, but I will conclude by asking: What would home be without that little plat of ground set apart as a garden, an orchard or vineyard; the tastefully laid out yard dotted here and there with trees and shrubs, or that window letting in the mellow sunlight, softened as it is reflected through a dense foliage of potted plants? And as we wend our way homeward after a day of toil, tired and disconsolate perhaps, we catch a glimpse of a loved form flitting here and there, singing snatches of some familiar song, now stooping to select a tiny bud which with skillful fingers is soon shining like a dew drop among that wealth of brown hair. As if by magic, our cares and troubles disappear and our every movement becomes more buoyant, and as we mount the steps we give way to that subtile charm of home influence born of love and flowers.

THE VINEYARD.

BY W. M. BOMBERGER, HARLAN.

The growing of the grape as a fruit crop will hold the same position in the future that corn has at present as a farm crop. It makes little difference what kind of a season we have, how wet or how dry, whether we have climatic visitations of any extraordinary nature, we always end up each season with a good average crop of corn over the entire northwest. It makes no difference if corn is worth 60 cents or but 10 cents a bushel, people will in this section plant a great acreage of corn. It is considered the leading staple and always a safe crop. We think that the time is rapidly approaching, and in many localities at hand, when the grape will hold just such a place as a fruit among other fruits. Be the cherry or small fruit crops

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ever so plenty, they do not interfere with the market for the grape. The wild plum thickets are rapidly being destroyed by making native timber lands pastures, and tame or cultivated plum areas for a long time will not be made sufficiently large to make that fruit take the place of the luscious grape.

Orcharding has its "ups and downs," and "off years," but the grape, if intelligently grown by the ton and sold so that it is possible for the masses to use the fruit extensively, is exceedingly profitable. This fruit can be planted and grown with more confidence than any other. Our climate is naturally too dry and arid for the currant and gooseberry; strawberries suffer for the same reason, and dry July and August weather make large plantations risky ventures. The cherry has not settled itself down to a commercial basis and planters have hesitated to venture into it on a large or even moderate scale.

The apple is largely planted, but is subject to many contingencies; there are off years, overbearing, blight, and in the northwestern section of the State is experimental, and has plenty of uncertainties. In good fruit years when fruit is plenty enormous quantities are consumed, and in off years the public is fruit hungry. But the grape is a sure crop if given high culture, and we have it to fall back on as something we can rely on every season. Have plenty of grapes on the home and town lot; have a good family vineyard; don't be afraid to plant a commercial vineyard; don't be afraid if the prices sink to 2½ or less than 2 cents per pound. They will pay well, as it is possible with intelligent culture to make fruit bring from $100 to $140 per acre at these prices. It makes no difference if grapes sell in cities at 23 cents per basket—there is always a wide country market that will pay more than that if the fruit is grown ripe and perfect with skill, and simply gotten in reach or in the sight of consumers. Local and city markets will always be flooded with mildewed and mashed and half-rotted grapes, but a good article, ripe, sweet, juicy, freshly picked, will always command a paying price. In many sections of the more favored fruit regions such as south Iowa and north Missouri, large vineyards were planted. When they came into bearing and the prices sank low many dug them up, and others turned stock in on them and tramped them out. The last two years when the apple crop has been light those that remained faithful in this line of work had very profitable markets, and many that destroyed their vines regret their action now. In my own locality prices this year went as low as 1½ cents per pound, but we had given our fruit good care, and sold none for less than 2 cents per pound, and received a return of over $140 per acre, and did not allow the vines to overbear. But we rarely sent out a ton or half a ton but what the quality brought back customers for double that amount. We wish to emphasize here the value of the Worden, and its value as a near market grape. It is not possible for any one to sell Concord grapes in a market that is well supplied with Worden. That is our experience repeatedly year after year. For home purposes and near market purposes it should entirely supersede the Concord. But it is somewhat more liable to overbear than the Concord, and somewhat more liable to diseases, and needs close pruning. The principal fault I find with all grapes is their overbearing. While the general verdict of the public is that Moore's Early is a shy bearer, I consider it bears just about right. We generally cut two to

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three baskets (climax) from each Moore's Early vine, while the Worden will give three to five if given enough bearing spurs. The Concord we consider an excellent grape, but it must be left on the vines until freezing weather. It is most always gathered from ten days to two weeks too early. As to planting, pruning and general management of the vine, we gave full details in the last report, Vol. 27.

DISCUSSION.

R. N. McCoy: What is the proper depth to plant grapevines?

Prof. Wernli: A vine three years old I would plant sixteen inches deep, and lay under the ground all but two or three buds.

M. J. Wragg: Plant one-year-old vines every time. There is then a uniformity between top and root. If left until two years old enough roots are not taken up to balance the top. One-year-old vines will nearly always produce fruit before the older vines.

REPORT OF COMMITTEE ON AWARDS.

For the best plate exhibit of apples, to B. Shontz, 50 cents for each of the following varieties: Iowa Blush, Fameuse, Fulton, Pewaukee, Grimes Golden, Tallman Sweet, Green Mountain Pippin, Plumb's Cider, Northern Spy, Ben Davis, Willow Twig, Seek-no-further, Golden Russet, Sheriff, Walbridge, Wealthy, Haas.

Display of apples, best individual collection, B. Shontz, $5.00.

Canned goods, M. E. Hinkley, 50 cents for each of the following varieties of plums: Pilot, Rollingstone, Hawkeye, Pottawattamie, De Soto, Wolf, Rockford, Forest Garden, Marcus, Maquoketa. Peaches, C. E. Greiner, 50 cents. Prof. Wernli, can of Miner plums, 50 cents.

Fresh grapes, 50 cents for each of the following varieties: Concord, Agawam, Worden, Pocklington, Martha, Lindley.

Best collection of plants, Mrs. Patty, $1.00; best plants in bloom, Mrs. Patty, $1.00.

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TREASURER'S REPORT.

RECEIPTS.

By membership fees	$ 73.00	
By State Society	150.00	
		$223.00

DISBURSEMENTS.

December 15, 1892.	To J. L. Budd, hotel bill	$ 3.00	
December 15, 1892.	To L. O. Williams, traveling expenses	9.00	
December 15, 1892.	To M. E. Hinkley, printing	13.68	
December 9, 1893.	To Jenness & Hills, printing	6.00	
		$ 31.68	
Amount on hand		191.32	
			$223.00

BUSINESS TRANSACTIONS.

On motion of Mr. Shontz the secretary was allowed a salary of fifty dollars for services last year.

On motion of Prof. Wernli, it was decided to hold a three days session next December.

The place for holding the next meeting was decided by ballot, in favor of Le Mars.

The present president, vice-president, secretary and treasurer were elected for the following year.

On motion of Mr. Emery, article 4 of the constitution was amended to read as follows: "The board of directors shall consist of one member from each county in the district."

On motion of Mr. Shontz, the president was instructed to send a delegate to the meeting of each of the auxiliary societies of the State and the expenses of said delegates to be paid by the society.

On motion of Mr. Terrill, the secretary was instructed to prepare a brief report of the proceedings of the society and send the same to newspapers of the district for publication.

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TRANSACTIONS

OF THE

SOUTHWESTERN IOWA

HORTICULTURAL SOCIETY

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LIST OF OFFICERS.

PRESIDENT.

M. G. EDWARDS - - - - - - Glenwood

VICE-PRESIDENT,

W. M. BOMBERGER - - - - - - Harlan

SECRETARY AND TREASURER.

GEO. VAN HOUTEN - - - - - - Lenox

DIRECTORS.

Sub-district No. 1, Mills, Montgomery, Fremont and Page counties—E. S. Welch, Shenandoah.

Sub-district No. 2, Adams, Taylor, Union and Ringgold counties—A. F. Collman, Corning.

Sub-district No. 3, Clarke, Decatur, Lucas and Wayne counties—S. L. Morrison, Chariton.

Sub-district No. 4, Pottawattamie, Harrison and Shelby counties—L. O. Williams, Council Bluffs.

Sub-district No. 5, Cass, Adair, Audubon and Guthrie counties—O. W. Rich, Atlantic.

Sub-district No. 6, Madison, Warren, Dallas and Polk counties—W. H. Lewis, Winterset.

Annual membership fee, $1.00; life membership fee, $5.00, which entitles the member to a postpaid copy of the State Horticultural Report, containing the report of the State and auxiliary societies.

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LIST OF MEMBERS OF THE SOUTHWESTERN IOWA HORTICULTURAL SOCIETY.

W. M. Bomberger.....Harlan
D. D Lyon..... Woodbine
W. K. Follett..... .....Malvern
James Rainbow..... ..... Macedonia
M. J Williams.....Glenwood
H. W. Berget.....Glenwood
Dr. F. M. Powell.....Glenwood
M. G. Edwards.....Glenwood
Silas Wilson.....Atlantic
Louis Fancolly..... .....Atlantic
R. D. McGeehon.....Atlantic
O. W. Rich..... .....Atlantic
D. J. Smith.....Council Bluffs
R. W. Carson..... .....Minden
W. W. Lotspeich..... .....Woodbine
J. W. Murphy. .....Glenwood
L. G. Bragg ....Kalamazoo, Michigan
F. P. Spencer.. .....Randolph
J. S. Sawyer..... .....Hillsdale
A. W. Harcourt.. .....Carson
J. L. Ellis..... .....Tabor
C. M. Follett..... .....Malvern
W. H. Lewis..... ....Winterset
Wm. E. Dean.....Glenwood
D. W. Faulkner..... .....Anita
W. O. Mitchell.....Corning
R. M. Skaggs..... .....Hillsdale
A. F. Collman..... .. ..Corning
T. J. Moon..... ... .Glenwood
H. D. Radeleff..... .....Manning
E. S. Welch..... .....Shenandoah
A. W. Pinney.... ....Council Bluffs
L. O. Williams..... .....Council Bluffs
F. W. Meneray..... .....Crescent

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LIFE MEMBERS.

Life membership fee, five dollars.

W. S. Agler.....Villisca
George Van Houten.....Lenox
Thomas A. Davis.....Glenwood
L. A. Williams.....Alvin, Texas
Alexander Wood.....Council Bluffs
F. G. Waterman.....Villisca
Leonard Everett.....Council Bluffs

HONORARY MEMBERS FOR ONE YEAR.

W. J. Davenport.....Council Bluffs
J. M. Bechtel.....Burlington
B. Shontz.....Correctionville

PREMIUMS SOUTHWESTERN IOWA HORTICULTURAL SOCIETY.

[Competition open to the world.]

TO BE AWARDED AT COUNCIL BLUFFS AT ANNUAL MEETING, 1894.

Display of fruit, county collection, first premium	$ 8.00
Display of fruit, county collection, second premium	4.00
Display of fruit, individual collection, first	8.00
Display of fruit, individual collection, second	4.00
Plate of apples, not less than four specimens, any worthy variety, first.	.25
Plate of apples, not less than four specimens, any worthy variety, second	.15
Display of vegetables, first	5.00
Display of vegetables, second	2.50
Display of canned goods, first	4.00
Display of canned goods, second	2.00

In county collections fruit must be grown in county.

In individual collections fruit must be grown by exhibitor, and on demand he may be required to make oath to that fact.

Parties desiring to enter same varieties in different classes must have duplicate entries, as the same fruit will not be awarded two premiums.

Exhibitors must properly label varieties, and file with the secretary a full list of varieties in each exhibit. In plate premiums exhibitor shall enter all names in one list.

If exhibits are small or unworthy of premiums offered, the Society or committee may award a smaller amount of money or refuse to award premiums on unworthy exhibits.

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STANDING COMMITTEES FOR 1894.

The following outlines are suggestive rather than arbitrary. It is expected that the persons named here will report on some particular phase of the general topic, rather than to cover the entire subject.

The Apple is King, J. Y. Stone, Glenwood.

The Comparative Value of Loess and Drift Soils for an Apple Orchard, J. W. Akers.

Cultivation and Fertilization, Judge Thornell, Sidney.

How may we Protect our Orchards from Mice and Rabbits, and How May we Pasture Them? Jas. Rainbow, Macedonia.

Modern Cold Storage, W. J. Davenport, Council Bluffs.

The Commercial Orchard, Geo. Van Houten, Lenox.

Insect Enemies of the Apple and Remedies, H. Osborn, Ames.

Russian Plums and Cherries—Are They Preferable to Our Native Varieties?—L. O. Williams, Council Bluffs.

The Cherry and Plum Orchards, W. H. Lewis, Winterset; F. P. Spencer, Randolph.

The Commercial Value of Plums and Cherries, W. M. Bomberger, Harlan; M. J. Williams, Glenwood.

How to Grow Peaches and what Varieties to Plant, W. W. Lotspeich, Woodbine.

My Seedling--How I Found It and Its Future, J. I. Bailey, West Branch.

How to Raise and Market the Grape, O. W. Rich, Atlantic.

Small Fruits, John Wragg, Waukee.

The Apple of Hesperides. J. K. Nutting, Glenwood.

The Discipline of Difficulty, W. O. Mitchell, Corning.

Climatology in Relation to Horticulture, J. L. Budd, Ames.

Land Values as Affected by Horticulture, J. E. Wickham.

Forest Trees and Leaf Mold, W. M. Bomberger, Harlan.

Longevity of Trees, C. L. Watrous, Des Moines,

Horticulture at the Home, A. S. Bonham, Council Bluffs.

What has the Horticultural Society done for Southwestern Iowa?—Silas Wilson, Atlantic.

Rural Homes, A. F. Collman, Corning.

Javanese Fruits, Geo. Van Houten, Lenox.

Spraying, L. H. Pammel, Ames.

Ornamental Shrubs and Plants, A. C. Sabin, Glenwood.

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MORNING SESSION—FIRST DAY.

The Nineteenth annual session of the Southwestern Iowa Horticultural Society met in annual session, in the new opera house, Glenwood, December 19, 1893.

The meeting opened with an invocation by R. D. McGeehon.

Renewal of membership was declared to be in order, and several new names were added to the roll.

DIRECTOR'S REPORT OF GUTHRIE COUNTY.

BY RICHARD HOPKINS, BEAR GROVE.

The past year has not been very encouraging to the fruit growers of Guthrie county, still there have been some experiences that will benefit the grower in the future. It has been the custom of many farmers, fascinated by the glowing fruit plates of the more fascinating tree peddler, to purchase large bills of trees without any adequate preparation for planting. The deliveries are made in the busiest time in the spring, consequently the trees are stuck into a post hole and allowed to take their chances without any cultivation. A few survive to be eaten down by stock the next winter. The same system is often repeated until many conclude there is no money in fruit raising in Iowa.

Apples were a very light crop; the early varieties were the most abundant. Oldenburg and and Red Astrachan afforded a few very fine specimens. Ben Davis, Willow and Winesap are the best of the late varieties; the Genet is rotting badly. The wood of the apple trees has ripened up well for winter.

Raspberries, a fair crop where properly cultivated; the most popular varieties are Gregg, Golden Queen, Shaffer and Turner. As to strawberries, some cultivators for market report Crescent short, Jessie fair, Belmont, Gandy and Louisa good. Snyder blackberry good in some localities. Lucretia dewberry, where trained on frame, a fair crop.

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Cherry buds all killed by frost before blooming. Plums a very light crop, both tame and wild, except the Damsons which produced well but not as heavy as last year. Grapes an abundant crop and prices ruled very low, which partly filled up the void caused by the failure of other fruits. Concord and Worden were the most prolific.

DIRECTOR'S REPORT OF HARRISON COUNTY.

BY D. D. LYON, WOODBINE.

The past season has been a very profitable one for fruit in Harrison county, especially cherries and winter apples. Most orchards had a limited supply of summer and fall fruit, but some of the largest and best orchards in the county were almost total failures, even in the early varieties. I know of only one man in the county who had an abundant crop. His trees were *heavily* loaded with choice fruit of early and late varieties.

Grapes were a good crop. We had a very small crop of plums and berries of different kinds, but cherries were a complete failure.

Several parties are planting small commercial orchards, and some are commencing to grow small fruit for the market, but it is only the beginning in this county.

A part of the summer and the fall months has been very dry and unfavorable for newly planted trees and vines, but many of my customers have reported no losses from last spring's planting; others a loss of from three to fifteen per cent.

DISCUSSION.

PRESIDENT WILLIAMS: The Guthrie county report says that Damson plums did well, while other varieties were generally poor. We would like to hear whether others had the same experience.

SILAS WILSON: Does he say what kind of Damson he has? Whether Shropshire or the small Damson?

W. M. BOMBERGER: The Damson has done well in Shelby county, on timber soils, for twelve or fifteen years, on its own roots. It has sometimes frozen back and it sometimes overbears.

SILAS WILSON: When I first located in Cass county I planted some Damson plums, but they froze out. I think that in timber or heavy clay soil they can be successfully grown in Cass county. I have faith in a good many varieties in such locations or on special soils that will not do well on the prairie.

R. D. MCGEEHON: When I was a small boy in Pennsylvania, I got some sprouts of Damson plum and planted them, and the trees

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did well. About twenty-five years ago I sent for some sprouts from those trees and planted them in Cass county, but they never bore any fruit. They never even had a blossom. They died of black-knot.

W. M. BOMBERGER: I can say a word about the plum that Mr. Wilson mentioned. Mr. McElwain, of Belle Plaine, sent specimens to the State Fair three years ago. They are said to be a seedling of Reine Claude. There was another fine plum there—perhaps a seedling of German prune. This year the trees were loaded to the ground. I think we should plant more seed.

SILAS WILSON: There is a tendency to call all good things, where names are unknown, seedlings. It often occurs that so-called seedlings prove to be old varieties. As fast as the identity of these varieties can be learned their proper names should be applied. At the Illinois horticultural meeting last week they had varieties called seedlings that proved to be old varieties, and so it often occurs. I have grave doubts about the Idaho pear; I think it is nothing but the old Sheldon pear. As grown in the Rocky Mountains, they are very large and highly colored. In color they are so different as not to look like the same pear, and they grow two or three times as large as grown east. With me they blight to the ground.

R. D. MCGEEHON: A neighbor got grafts of plums of Mr. Dennis and Prof. Budd and grafted into the wild plum. He says the Algy plum is like the Communia—the fruit being exactly alike, but the trees are not alike.

W. M. BOMBERGER: According to Downing there are twenty-five varieties of the Gage plum, and of course there are varieties with a very little shade of difference.

SILAS WILSON reported verbally, as director of Cass county, in substance as follows: There is very little to report. Apples were comparatively nothing, ten to fifteen per cent of a crop. Very few varieties fruited. All have opinions as to cause of failure. I attribute the failure to unfavorable weather at blooming time. Cherry trees failed to bear. Strawberries one-half crop and inferior quality. Raspberries were fair in some localities; in other places the crop was not up to the average. Blackberries about half a crop. Plums nearly a failure, yet in some localities there were some plums. The general interest in fruit growing about an average. The grape crop was good and of good quality. Grapes were very large and fine. I was a little disappointed in some of the newer sorts, especially the Eaton. I cannot recommend it. Moyer does not have good foliage. It has indications of Delaware breeding in its foliage and I do not think it will be hardy. Think well of Moore's Diamond. I regard Pocklington as the best white, and Moore's Early the best

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black grape for commercial purposes. For money making Moore's Early will outstrip all rivals. Worden and Cottage are good for family use, and the Worden is good for market, but the Moore's Early is a better shipper than Worden.

DR. POWELL: How would you rate the Pocklington?

SILAS WILSON: Pocklington is hardy but not a very strong grower; it requires good culture and high manuring. It is a valuable commercial grape.

W. M. BOMBERGER: I would like for Mr. Wilson to tell us some more of Moore's Diamond.

SILAS WILSON: I do not know that there is anything wrong with it. It has not as good foliage as Moore's Early or Worden, but more like Pocklington. The leaves are small and scattering, as compared with the best kinds. With my experience would favor Pocklington rather than Moore's Diamond for commercial purposes.

PRESIDENT WILLIAMS: More of the Moore's Diamond have been planted around Council Bluffs recently than any other white grape.

W. M. BOMBERGER: Such locations as Mr. Woods' at Council Bluffs is the best for grapes.

R. D. MCGEEHON: A few years ago I planted grapes for my own use. I planted Moore's Early, Worden, Agawam, Pocklington and Concord, and would plant the same again. The Pocklington is so far ahead of the Niagara as to leave no room for comparison.

PRESIDENT WILLIAMS: A west slope, or southwest as has been told in the discussion here, is the best exposure for grapes. Mr. Raymond says the Niagara must be planted on high ground. It fails on low ground, but thrives on the high bluffs of the Missouri slope.

DIRECTOR'S REPORT OF RINGGOLD COUNTY.

BY D. N. SMITH, LENOX.

The past season has been discouraging to the planter of fruit. The trees did not seem to make much growth. The trees that were old enough to bear blossomed fully, but the blossoms dropped, or formed apples which dropped when as large as hazelnuts. I believe in spraying from bloom till the apple turns down; and that often if showers come often. Plums no crop; cherries very light crop; currants fair crop; grapes, Concord, good crop; raspberries winter-killed badly; blackberries killed the worst I ever saw them. I have the Snyder and they have

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not killed to do any damage for eight years before. Old settlers of our county say the same thing about the Snyder. We had a goodly number of apples. Our Benoni was very full, commenced ripening the middle of August. Then Grimes Golden and Jonathan for fall; Cumberland Spice for October; then W. W. Pearmain, Minkler, R. Stem, Genet, Ben Davis and Winesap. All told we harvested 300 bushels, and sold all in the orchard at 75 cents and $1.00 per bushel.

DISCUSSION.

GEO. VAN HOUTEN: Mr. Smith, as usual, reports favorably on the White Winter Pearmain. This must be due to the peculiar soil of his location, on a hill near timber, for this variety generally fails around Mr. Smith.

Several members gave it as their opinion that the results of spraying had not been as good as was expected, and that especially for fungus diseases spraying had resulted in disappointment.

AFTERNOON SESSION—FIRST DAY.

Society convened at 1:30.

THE SOIL, LOCATION AND DRAINAGE OF THE ORCHARD.

BY W. K. FOLLETT, MALVERN.

For the apple orchard, I would say select the highest ground possible, for the double purpose of air-drainage and avoiding late spring frosts, with as much north hill slope as you can get. Plant the more tender varieties on the east side and the hardier or iron-clad varieties on the west. I would select the class of subsoil that has the most gravel and lime in it, as I find that nearly all kinds of trees bear better on that soil, and are longer lived than on the heavier soils. I find from observation that the Fameuse apple is best adapted to the heavier soils and will bear more abundant and larger fruit on heavier soil, than on poor and higher ground; and seems to be as healthy on such soil as on higher ground. Fameuse is the only apple tree I know of that does better on low ground than on high in this county.

As to drainage, if the orchard is farmed to corn a few years before coming into bearing, it will have all the surface draining necessary. Under, or tile-drainage, I know nothing about, but will hazard the opinion that if

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soil is so wet as to need under-draining, you had better plant corn than apple trees on it.

Professor Budd once said that the hills around Corning were worth one hundred dollars per acre; and he was right. Equally valuable are all of the bluffs bordering on our streams, and the nearer you get to the Missouri river, the more valuable they are. But I would put potatoes and corn in the hollow between the hills.

DISCUSSION.

DR. POWELL: I would like for Mr. Follett to tell us the kind of soil suitable for the Fameuse apple.

W. K. FOLLETT: The soil we used to know as blue joint land. The Fameuse will do well on side hills and in places between the hills where Ben Davis and Genet will die. Our soils are so varied that trees do quite differently on some. The shelly subsoil is best, but where there is a drift with gravel ten to fifteen feet, trees will die. Out in Mr. Williams' orchard the trees are dead in the draw. You may take the orchards out in Clear Creek township, and there are few of them planted five to ten years but what are dying out. The nearer you get to the bluff deposit the better. The bluffs with gravel are worth $200 per acre for orcharding.

DR. POWELL: This is a very interesting subject and while Mr. Follett was talking reminded me of some things that resulted differently from what was expected. In one orchard on the highest ground the trees died most, where we expected the best results, and the poorest trees I have are on a ridge.

W. K. FOLLETT: There are things we cannot account for. As a rule the highest ground does best, but there are exceptions. This was an off year. In selecting for the Columbian Exposition we found it difficult to get good specimens. In Wm. Rains' orchard we got splendid specimens. His brother had about 500 trees, about half a mile away, of about the same age and variety, and all were wormy. This last orchard was on high ground while the first was at foot of the bluff. These are exceptions to the general rule and we cannot always explain the reasons.

PRESIDENT WILLIAMS: Mr. Follett said better to plant corn on land that needed draining, and yet it has been shown here to-day that the best crops of fruit were grown the past season on bottom land. Prof. Budd made a remark last winter that if the orchard was but a few feet above surrounding land it would afford drainage. I think that plow drainage or ridging up will do for most varieties.

DR. POWELL: It might be if we had time to inquire into all the causes, that the different treatment would account for the difference in results.

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VARIETIES AND CULTIVATION

Had been assigned to Geo. Van Houten, who spoke substantially as follows: Circumstances have prevented me from preparing a paper on the subject assigned. I shall try to open the subject and bring out discussion. The ground should be in good condition for planting and the planting done as soon, and not before, the growing season arrives. The cultivation should be thorough during the early part of the season, inducing a free growth. I have tried different kinds of crops in orchard and have found corn, all things considered, to be the most desirable. It does not exhaust the soil, neither does it interfere with tree growth early in the season, while the later growth induces the trees to grow in proper shape. Cabbage exhausts soil and should not be grown in orchard. If corn, or even one row for each tree row, is left over winter it affords protection from damage by rabbits and mice. I remember that Mr. Follett has reported damage while corn stood in the orchard, yet the fact remains that such an experience is very exceptional, and that corn left in the orchard is a good protection. Corn can be continuously grown and trees pushed to a rapid growth until near bearing size when the land may be seeded to clover. I again renew my recommendations of close planting toward 1:30 o'clock sun, with a view of thinning as the trees begin to crowd.

As to varieties, I again urge, as I have so often before, that the most valuable guide is the experience of near-by planters on similar soil and exposure. Of course there are certain varieties like Oldenburg, Fameuse, Jonathan, Grimes and Ben Davis that can be planted in every orchard. Planters should be slow to accept the recommendations of those who are having first experiences with new varieties. Nearly every year we hear of some new candidate for public favor, highly extolled, but it soon passes out of notice and proves undesirable. Again, a variety may be valuable for home use and the very qualities so recommending it render it worthless for market. The Harvest Red Streak may be given as an illustration. It ripens but a few apples each day and continues in fruit during six or more weeks. Varieties of good size, color and appearance often sell better than varieties of better quality but lacking in some of the salable qualities. The Ben Davis may be given as an illustration. As people acquire better knowledge of fruit they learn to discriminate and use certain varieties for certain purposes. For example, Rome Beauty is superior for apple butter, Jonathan for pies or cooking generally, while Grimes is a splendid baking apple. The blossom end should be gouged out and the cavity filled with sugar before baking. Ben Davis is a good canning apple after it matures—say from January until

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spring, and those who have never canned it when at its best will be surprised at its good canning qualities.

For market, only a few varieties should be planted, and those of known reliable sorts, leaving new varieties for amateurs and experimenters. For home use the taste of the planter should govern. For example, the Red June might be named. It has but little to recommend it, except to those who have acquired a taste for it, and yet I would not want to omit it from a list for home orchard, as I early acquired a liking for it.

DISCUSSION.

D. J. SMITH: You have not told us as to age of trees to plant.

GEO. VAN HOUTEN: I purposely avoided that question, but since it has been called up will say, that I believe the nursery is the place to nurse trees. If trees can be taken fresh from the nursery at three or four years old in good condition and under favorable conditions, they should do better than younger trees. It is almost impossible to make young trees grow straight up when set in orchard. They are so small and limber that the winds and sun cause them to lean badly. Older and stronger trees will do better. If trees are to be shipped or kept out of the ground a good while, of course the advantage is with the younger trees, as they can be better protected than when larger.

R. D. MCGEEHON: I had an apple tree that was barked; I bound it up with mud, and it healed over in one year and made a sound tree.

W. K. FOLLETT: About four years after my orchard was set, thirty or forty of them were barked all around. Mr. Walton told me that if "the bone of the tree," as he called it, was uninjured, they could be saved by banking up. I banked them up, and they grew well, and you could tell no difference after awhile. I tried to poison mice with corn meal and strychnine, mixed with water, but it froze up. I then tried mixing dry, and got the whole colony; found several dead ones and their work stopped.

DR. POWELL: Why not bank up the trees before they are girdled?

W. K. FOLLETT: I am a lazy man, and don't like to bank them up unless I have to do it.

MR. WILSON (of Mills county): There is one variety I want to recommend. I was raised in Ohio, where we had plenty of apples, and knew good apples when we saw them. I want more of this variety, and would plant five hundred of them if I could get them. I refer to the Sheriff; the apple is long, reddish green.

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ORCHARD PLANTING AND PRUNING.

BY T. J. MOON, GLENWOOD.

To be successful in tree planting judgment should be used, not only in selecting the trees, but the preparation of the ground should receive due attention. Remove all trash. I prefer fall plowing. I like a northwest slope, but should set an orchard regardless of location, but think high land that is rolling preferable. As to distance, I will state that twenty years ago I set out an orchard of about 200 trees twenty-four feet apart each way that has been very productive, and at this date they have abundance of room. Dig the holes large and roomy so as to fill in a few inches of surface soil when planting. All wounded roots should be cut away. Place the tree as grown in nursery, setting a few inches deeper; pulverize the dirt. on which place the roots nicely straightened, and they should be wet if the soil is dry. Lean the tree to the southwest, filling carefully and packing quite firmly.

As to pruning, if a tree was forked I should cut off one of them and try to form a top that would not split down. Otherwise I would not trim at setting, preferring to wait one or two years. I do not favor high heading. I have never seen an orchard that was satisfactory. The top is too small, and another reason is that for some fifteen years nearly all the apples are on the lower branches. They are much more easily gathered, and I think are longer-lived trees.

I am watching an orchard in the south part of the county that had been allowed to branch out about three feet from the ground and the center cut out. The fruit is very fine. A few more years will tell us the result; it is now some twelve or fifteen years from planting.

I trim in February or June, thinking that at that season the sap does not flow so readily. I have noticed in some orchards black spots on many trees and cannot attribute it to any other reason than that the sap drying on the tree causes the discoloration, nor decide whether it will be an injury. I would like to know what the society thinks of this matter. I cut smooth but not too close.

DISCUSSION.

JOHN Y. STONE: I believe in close planting. It utilizes the ground for the first fifteen years, so we can use about all the surface. Trees should be thinned out so that those which are to remain shall not be injured. As to exact distance I am not certain. Think that I have some too close for cultivation, but not too close for tree growth in the old way of not cultivating. I have intended where trees were fifteen to seventeen feet apart to cut out each alternate tree, so as to

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leave one in the center of square. I am satisfied that in this dry climate, there will be a sufficiency of sunlight and air to mature fruit. Have noticed that trees bear well here until limbs interlock. My friends tell me that I will not cut out the trees, but I think that when the time comes the trees will go out. The main purpose is to utilize the ground and get the trees to grow in proper shape and this can be accomplished by close planting.

L. O. WILLIAMS: I would like to inquire as to sun-scald and whether the trees grow more upright?

JOHN Y. STONE: I have never been able to learn the cause of sun-scald. I thought it occurred in the summer, but perhaps it occurs in the winter. I find such a difference of opinion among experts that I do not pretend to know. It may be that the breaking of the force of the sun by the limbs of other trees is sufficient to prevent it. I have not had much of it. One high-headed tree, on a southwest slope, sun-scalded.

W. K. FOLLETT: You old members will remember that Mr. Van Houten and I have had many tilts on the question of sun-scald. I thought it occurred in June. Last year in Oklahoma, I found my pet theories about June sun-scald unfounded. As we were coming up from Texas, the mercury ran up to 80° and then a blizzard struck us; we had been riding along and had the car windows open and were hot, but when the "norther," as they call it, struck us we put on our overcoats in a hurry. I stopped in Oklahoma and it got warm again. I went to see an orchard of a man who had come from Iowa. I had heard this orchard bragged on, and the trees did look thrifty, but they were split as if done with a knife. It was newly done and the bark was drawing up, and I made up my mind to take back what I had said about sun-scald in summer. I pruned some trees a few years ago in early spring and ruined them. The sap ran down and blackened the trees. The trees are dead now. I showed some of them at our county horticultural meeting. I also showed samples of trees pruned in October, also of forest trees split with sleet. I by accident stumbled onto October pruning. I had to haul apple barrels into the orchard and the trees were so close I had to saw off the limbs to get through with a wagon. The limbs hardened up like buck's horns and the trees healed over perfectly. I have been watching those trees and have been so favorably impressed that I have pruned half of the orchard in October and November.

GEO. VAN HOUTEN: I sawed limbs from apple trees in October, so as to get through with a wagon, and the limbs cut off hardened as they dried, healed over and remained sound.

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W. K. FOLLETT: I have noticed that trees broken with sleet in February rot quickly.

PRESIDENT WILLIAMS: The State society and this society have decided that June was the best month to prune. Do we intend to go back on the judgment of the societies?

W. K. FOLLETT: I gave you my experience with fall pruning and shall watch closely and report. I shall know more about it, and if there is a better time than June I want to know it.

SILAS WILSON: Have you had bad effects from June pruning? I think this matter of pruning and the best time to prune has been settled, so far as the societies can settle it, by recommending June as the best time, beginning when the leaves are half grown. It has been the general experience that no bad results follow June pruning. I well remember the first orchard I planted. It had been neglected. I gave it a severe pruning, and the next winter was a hard one, and the trees were badly damaged. Pruning should begin when trees are small and only a small amount done each year. I am in favor of standing by the recommendation of the societies.

GEO. VAN HOUTEN: I am also in favor of standing by the recommendation of the societies, but I desire to correct the statement. The recommendation, as I remember it, is: "The best time to prune is when the leaves are half grown, completing the pruning as soon as possible." This leaf development sometimes occurs in May and generally very early in June and some seasons the last half of June is too late. While adopting the recommendations of the societies, we can and should investigate. Further experience may prove that for old orchard trees October is a good time to prune, and while my limited experience will not justify me in recommending it, I do say it is worthy of further trial.

W. K. FOLLETT: A friend came from Ohio and thought we were not pruning our trees right. He pruned five trees for me and five for his brother. Four of the trees he pruned for me died, and three of those pruned for his brother died. A man went over to Mr. Cooledge and asked for directions about pruning and the reply was "haven't you got any sense?" The man went back and cut the center out of about half of his trees. They are all dead. They died years ago. I prune a little every year, in May and June, mostly on the north side. I do not believe in heavy pruning and do not prune for two years after planting.

DR. POWELL: I would like to ask Mr. Moon about his trees that had the center cut out.

T. J. MOON: The orchard is healthy. The center of the trees was cut out.

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PICKING AND STORING APPLES.

BY F. M. POWELL, GLENWOOD.

The old adage, "Not what we earn, but that which we save, that counts," will serve to introduce the subject assigned me—"Picking and Storing Apples." Every business has its rules to govern its operations. A limited reference to the methods for harvesting and caring for the apple fruit is intended to be presented in this paper. It is well to remember that the apple is a perishable fruit and therefore requires careful methods to bring about the most desirable results. At what stage of maturity to harvest, depends upon the kind of fruit and the disposition to be made of it. For commercial purposes it is an established rule to begin work before the fruit is thoroughly ripe. In doing this there is a gain in quantity, as every day brings a loss by windfalls and insect destruction, with risks of greater losses by inclement weather. Shippers especially, request early picking, claiming that the fruit bears handling better and will arrive at the consumer's market in a more attractive condition, thereby assuring a more ready sale with better prices.

I remember distinctly a heavy crop of Plumb's Cider apples that was neglected until nearly the full yield was dropped and was marketed at less than half the contracted price. The fruit falling and consequent decay increased the rate of loss until only one-fourth per cent of value was received. It is true that the variety has something to do with the stage of picking. Rawle's Genet, Ben Davis, Jonathan and others require time to fully ripen and acquire their most attractive color, and the Winesap especially secures its greatest growth during the last month of its growing season. With such varieties, then, we can afford to give more time to the maturing process than to many others, such as Oldenburg, Plumb's Cider, Red June, Whitney No. 20, and other early varieties. In all these varieties something is gained in size by permitting the fruit to remain on the tree until it is fully ripened; not enough, however, to balance the loss by fruit falling and decaying.

For home use I prefer well matured apples before the ladder and basket are brought into use.

METHODS OF PICKING.

My experience and observation is limited to the old custom of ladder, basket, man and boy combination. As to the kind of ladder to use, I have no suggestions exeept to say that any well made ladder of proper strength and proportions will answer the purpose. The wire basket to fasten to the

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end of a pole with a fork attached to break the apple loose may be useful where apples cannot be reached in the ordinary way; otherwise use the old-fashioned baskets with attachments to fasten to the limbs. It is better that the man occupy the ladder, plucking the fruit from the terminal branches, while a boy may operate on the inner branches, meeting the man with basket, with instructions to pluck leaving the stem attached to the apple. The proper caution exercised with this old method can be but little improved upon.

At the time of picking, a man should be on the ground with barrels and carefully sort the fruit and pack it, after which it should be taken to the fruit house—barn or shed, well protected, will do—and left until the sweating process is completed, when the fruit is ready for storage. Or, if you are intending to ship apples yourself, it will require even more careful packing than when intended for family use. I do not believe that the common method of facing the ends of barrels with extra fine apples and a poorer quality in the middle is good policy, or that it will pay. Where either end of the barrel opened represents the true grade of the fruit all the way through, you will find that the customer will pay better prices and will command trade which otherwise could not be secured, and you will obtain a permanent customer.

I notice a suggestion in one of the papers like this: "On one occasion I shipped twenty barrels of apples to a customer during the holidays. The weather was mild when I shipped. Fearing it might turn cold, I lined each barrel with two thicknesses of paper. They were detained by mismanagement in transit for over two days and nights on the track. The second day the mercury went down to twelve degrees below zero. There was no fire in the car, but they went through safe. The dealer acknowledged the receipt with draft and wrote: 'I have been dealing in apples for years, but never knew how to pack apples until I saw this lot.' He has continued to buy of me ever since."

A dealer in apples in England suggests that to protect a large portion of apples that are shipped to Liverpool from becoming rotten he would pack the apples in boxes similar to egg cases, treating them as living fruits, keeping them in an atmosphere not higher than 35 or 40 degrees, with earth in the bottom of the vessel to attract the foul air. This part of the management of apples, however, comes under another heading, and is only mentioned in this connection as the packing is often done in connection with the picking.

STORING APPLES.

I understand it to be conceded generally that the best conditions for storage is a cool, well ventilated room, where the temperature can be kept uniform and just above the freezing point. Some prefer the house above ground, claiming that where the apples are stored in the earth they will come out with a peculiar flavor not as pleasant as the real flavor.

One man writes in *American Gardening* that he buried his apples four inches deep, and that his Baldwins came out as sound as the day they went in. The tops of the pits were exposed to all the cold winter, and yet the apples were not damaged by frost. This man recommends this plan as the very best. Another writes in the same magazine of different date, that his plan is to have the building wholly above ground, double the wallst

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leaving air spaces, double windows for greater security, and the faces of the double walls to be lined with felt. The roof also should be double, with provisions for ventilating. Air should not be given except when the temperature on the outside equals that within. Otherwise there will be troublesome condensation of moisture which should be avoided. Have shelves on the interior where the fruit may be spread and so arranged as to be easy of access for handling and observation. The fruit may be several courses thick or heaped in piles without injury. Over all this may be placed some protection if considered necessary.

These methods apply principally to storing apples for home use. My own observations and experience confirming the suggestion that a fruit house properly arranged above ground is the most successful method of storing apples. If from a commercial standpoint, apples are to be stored for market, the modern processes of cold storage have already revolutionized the keeping and management of apples.

This subject of itself would require a lengthy paper to bring out facts which I am not prepared to present. I may say, however, that enough is known to warrant the conclusion that in every community where fruit is raised for commercial purposes, either individuals or an organized company should provide cold storage capacity, the advantage being that the seller can choose his time of marketing.

PACKING AND MARKETING APPLES.

BY A. F. COLLMAN, CORNING.

The subject assigned me is one that every fruit grower should be interested in. It is easy to plant and take care of apple trees, and it is a very pleasant duty to go through our orchard before picking time, and make an estimate of our apple crop, and count the cash with a pencil. Of course we figure on the highest quotation that we see in the Chicago market, and feel sure that our apples will bring the gilt-edged prices. But, alas, our hopes are like bubbles that look so beautiful at first, then vanish so quickly away. We gather them all in, and too often tell our help to put the little apples in the middle of the barrel. They will all do for the city folks, and besides they will never know where they come from; and we will get just as much for the little as large ones. But stop and wait a moment; here comes Mr. Smith, all excited. "Say, mister, why did you sell me that barrel of poor apples? I bought and paid you for good apples. I found a few good apples on top of the barrel and the rest are only a second class cider apple, and what are you going to do about it? I don't want them at any price." The commission merchant straightens up and says "I bought them for No. 1 apples, and I opened a barrel and they looked good on top. But, Smith, you bring them back and we will look them over." Smith brings the apples, and the commission merchant calls Sam, and says, "Grade that barrel of apples and make them No. 1." Sam brings in the

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returns and says, "I made it just one-half barrel." "Well, Sam, charge up the time to Jones, and make an estimate on balance of his shipment." Mr. Jones receives his returns; Jones is angry when he finds that he gets just enough to pay freight and cooperage, and says the apple business in this county is a failure.

How to Get the Gilt-Edge Prices.—Pick your apples with great care; be very careful not to bruise them in any way; then have a careful hand grade and pack them; put good, sound, merchantable apples in the bottom of the barrel, such as you would set before your friends, and put in no other all the way up. Be careful to do the work neatly, and finish the barrel nicely. Always handle with care, and be sure that your apples are *true blue all the way through.* Then sell to good reliable parties that are well established in business and market them as quickly as possible, and it will not be long before your goods will bring the highest cash price. Be honest, be true and diligent in business, and you will make the fruit business pay in Iowa.

DISCUSSION.

W. M. BOMBERGER: I would like to ask Dr. Powell as to the keeping qualities of Oldenburg in cold storage.

DR. POWELL: Prof. Budd last summer spoke of the Oldenburg as a keeping apple, and we find it keeps well in cold storage. They are now put in cold storage and kept till midwinter and served at hotels for dessert apples.

J. W. MURPHY: Here are some Oldenburg in good condition, as you see, kept in a meat market refrigerator until six weeks ago, since which time they have been kept as other apples.

A. F. COLLMAN: We had Willow at Chicago, of crop of 1891. They were on the tables for six weeks after coming out of cold storage. The charges were nominal. We had five or six barrels there from the time of the State meeting, with grapes and other fruits, and the charges were only $1.75. It will cost, perhaps, ten cents a barrel for cold storage.

PRESIDENT WILLIAMS: The specimens shown here are not attractive. Is it necessary to gather Oldenburg and other varieties so long before maturity that they are lacking in color and general fine appearance?

F. P. SPENCER: The cost of drayage and cold storage in Chicago amounts to about fifty cents a barrel.

GEO. VAN HOUTEN: With new methods of cold storage the charges are very light, as compared with former cost. The cost is, perhaps, less than half what it would have been a few years ago. Ice is not packed as formerly, but manufactured by the ammonia process.

F. P. SPENCER: Cold storage now is by the ammonia process, and all new factories are erected on that plan.

W. M. BOMBERGER: The Oldenburg apple can be raised profitably in various parts of the State; in fact, in all portions of the State.

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You can raise many other varieties here, many more than we can, but an Oldenburg orchard would have proved profitable this year, and you would get three or four crops about every four or five years.

PRESIDENT WILLIAMS: The question is, can they be kept if allowed to mature on the trees? To be salable they must be colored. I would like to ask as to the season those Oldenburgs shown here were picked.

J. W. MURPHY: Oldenburg to be put in cold storage must be picked early. These shown were picked very early, with a view of keeping them without cold storage. If the Oldenburg are gathered early and allowed to wilt they can be kept anywhere. These have been out of cold storage for six weeks. They were sent to the State Horticultural meeting and then shipped back.

PRESIDENT WILLIAMS: I think the success of cold storage will depend on preserving the color of the fruit.

W. M. BOMBERGER: I would like to ask if cold storage destroys the color or injures it?

A. F. COLLMAN: I think apples will lose color, even in cellar. Those kept in cold storage did not seem to lose color after being put on the tables at the Exposition. We had summer apples, gathered in August, that kept well to the last. The Longfield kept color and flavor well. Newhall & Son told me that they kept apples two years in good condition in cold storage.

EVAPORATING AND CANNING FRUITS.

BY W. O. MITCHELL, CORNING.

Evaporating and canning fruits for mercantile purposes in Iowa is in its infancy, and on account of the failure so far of fruit crops would be a very precarious business.

For any business to be successful it must be surrounded by stable or certain conditions. In a territory contiguous to or within a radius of twenty or thirty miles of a large city, evaporating of fruit will probably never pay. Where fruit can be picked and hauled to market it will usually sell for more than the same fruit after it is evaporated. But in localities where there is no local market, apples that will not bear shipping can usually be made to bring twenty-five to fifty cents per bushel by use of the evaporator.

In 1891 a number of farmers and business men in and about Corning,

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subscribed stock for buying and starting an evaporator, paring-machine, etc., which were purchased from the American Manufacturing Company, at a cost of about $175. No one of experience could be found to operate it; but it was soon found that any one of ordinary intelligence could handle it. Apples were bought at from fifteen to thirty cents per bushel. A man and two boys were hired at a cost of $2.50 and it cost about from 50 to 75 cents per day for fuel, and with fair apples they could evaporate about twenty-five bushels of apples per day, making from 150 to 250 pounds of evaporated fruit.

The account would stand about as follows:

DR.

To 25 bushels apples @ 25c	$ 6.25
To 1 man	1.50
To 2 boys @ 50c each	1.00
To coal or wood	.50
To sulphur for bleaching	.05
Total	$ 9.30

CR.

By 250 pounds evaporated fruit @ 6c	$15.00
Profit, $5.70	

The number of pounds per bushel will depend very much upon the varieties of apples used, the Ben Davis, Willow Twig and Oldenburg yielding about ten pounds per bushel; the Maiden Blush, Grimes Golden, and other like varieties, seven to eight pounds, while the Fameuse only made four to five pounds. The evaporated fruit was of the best quality, and brought the highest market price. By holding it a short time the price realized was about eight cents per pound, but in a few weeks afterward, it was worth ten cents.

In a good season an evaporator can be made to pay for itself and earn a good profit besides, to say nothing of the market it affords for fruit that is otherwise wasted. A cider or vinegar factory to use up the refuse, and also such apples as are not suitable for use in the dryer, could be operated with great advantage and profit in connection with the evaporator.

As to canning fruits for market the industry has never to my knowledge proven profitable in Iowa. The uncertainty of the fruit crop has probably been the greatest drawback. In order to compete in the market the work must be done on a large scale and small margin, a few cents per can being all that could be expected. On account of the local demand and ready market for fresh berries, prices have been such that factories could not afford to can them. There seems to be, however, no reason why the canning of apples should not be a paying industry. We have the finest varieties in the world for canning purposes. The canning factory at Corning experimented on a small scale with Jonathan; they were found to have the most delicious flavor, although put up without any sugar. A few sample cans were sent to Marshalltown, Sioux City and other places, and the jobbers could not be convinced that sugar had not been used in packing.

If, however, the time has not arrived for canning fruits for market at a profit, we ought, nevertheless, to stimulate home canning for home consumption. For perfect health and home luxury, our people do not use one-quarter the fruit they should. This is not to be wondered at perhaps, when

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we consider the quality of canned fruits usually bought at the grocery store and used in the ordinary family.

While upon the Pacific coast a few years ago, I was much interested in visiting and watching the process of canning in some of the large packing establishments. I soon learned that three grades of goods were prepared. In the first, nothing but the choicest, selected, ripe fruit with a thick, heavy syrup was used. In the second or standard grade, fruit not fit for the first and a thinner syrup; and in the third or cheap grade, all refused and damaged fruit with just enough sweetening to keep it. I further learned that none of the first-class goods were ever shipped to interior states or towns except by special order.

No well regulated family or household of five persons should start into the winter with less than from 150 to 250 quarts of canned fruit.

With prices and varieties of fruit to be had in the fall, the cheapness and utility of cans and jars, and with the present price of sugar, there is no excuse for almost any family sitting down to the table a single day in the year without fruit of some kind. If the average housewife were as careful and earnest in providing these luxuries for the family as the man is in laying in sufficient provender for his stock, much more fruit would be used, and the comfort, digestion and happiness of the family greatly increased. It is said that "variety is the spice of life." This adage is nowhere truer than when applied to the home table.

Much is said and written about how to keep the boy upon the farm. Music, beautifying the home, home adornment, and many other things have been recommended. These are all good in their place, but I know of no surer method than to appeal to the average boy's stomach and appetite. This craving for fruit is natural to children, and does not diminish with age.

With the apples, plums, grapes, strawberries, raspberries and blackberries grown in southwestern Iowa, fruit for every day in the year is within the reach of all. There is always a surplus of some of these fruits in their season. The first cost is not great, and the process of canning is not difficult. Almost any woman of ordinary strength and intelligence can put up fifty to sixty quarts of berries in a day with ease. When our people have once learned not only to make the surroundings of home attractive, but to supply the table with the choicest home-grown fruits and vegetables, the average boy or girl will be as anxious to stay upon and retain the farm as other people are now to buy or trade town property to the parents for it.

DISCUSSION.

W. M. BOMBERGER: I have canned Ben Davis apples for four years, and if a little quince is put in them they will be so good that even Mr. Collman would like them.

A. F. COLLMAN: I don't see why you all pick on me, but Mr. Bomberger's method of canning Ben Davis reminds me of the story of the man who said he could make soup with a stone, and when asked how he would do it said he would put a stone in a kettle with some water, then put in a piece of meat, some salt, pepper, butter and such other seasoning as needed and the result would be good soup

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with a stone in it. So you can disguise the Ben Davis with quince and Jonathan and other fruits.

D. L. HEINSHEIMER: We had some experience in canning apples. When we paid seventy-five cents a bushel for apples we lost money. There have been times when we could buy apples at prices low enough to pay to can them, but it will not pay when prices are high. Two years ago we paid ten to fifteen cents per bushel for windfalls and did very well canning them. Half gallon and gallon cans are desirable as lessening the cost, but we cannot expect to run a canning factory every year. We have to depend on the surplus stuff. Ben Davis we find good for canning. It is true that they are spongy, but good Ben Davis can well and give satisfaction.

JOHN Y. STONE: I have been hearing the Ben Davis laughed at for twenty-five years, but it goes steadily on. It is the last apple we have in the spring and always commands big prices. I do not see how you can stop the Ben Davis. It has been roundly abused yet it keeps ahead of all competitors. We who study trees and plants are too apt to imagine we are raising apples for people in the eastern States, with educated tastes, yet about one man in a thousand buys for quality, while the larger number buy for appearance. The Ben Davis is not only handsome but stands rough usage. It is useless to talk against it. The eye, after all, decides more for us than the other senses. How often we read in stories, and see it in real life, that the homely girl with all the virtues and many accomplishments, is passed by for the beauty who may be gifted with few if any accomplishments. Beauty pays, especially in apples. The big red apples—the Ben Davis takes the palm and nothing has yet been developed that will equal it in ability to stand rough usage. It outbears all others and without cold storage few will approach it in keeping qualities. It lasts until May and June, and no other apple is so satisfactory. I protest against the constant jokes about the Ben Davis, and think the abuse of this variety has been pushed too far.

R. D. MCGEEHON: I do not use Ben Davis until other varieties are gone. I have used them cooked, and thought them pretty good, when I did not know what they were. I have eaten the Ben Davis on the Platte river in Missouri and found them much better than we can grow them here in Cass county. So I think the Ben Davis you grow here about Glenwood are better than can be grown on the prairie.

W. M. BOMBERGER: There were one or two carloads of oranges shipped from California to Harlan and they sold at about $1.50 a a bushel while Ben Davis were bringing $2.00. Fifteen cents worth of quince will flavor several bushels of Ben Davis apples.

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The subject, "Future of Orcharding in Southwestern Iowa," had been assigned to John Y. Stone.

JOHN Y. STONE: I have not prepared a paper on the topic assigned, and have but little to say on the subject. It would require the gift of prophecy to talk confidently and intelligently as to the future of fruit growing. We now know that we have soil and climate remarkably adapted to fruit growing, and it seems to only require intelligent selection and proper care to insure success. It is true that we have great variety of soils but by proper selection of varieties adapted to our different soils and exposures, there need be no failures. There is one merit in the apples grown in southwestern Iowa. They have fine appearance and keeping capacity and they have superior quality. These qualities insure purchasers and an increasing demand for our fruit. I was in Minneapolis a year ago last June, and was met by a man who had apples stored from here and Missouri, and he informed me that our apples kept from six to eight weeks longer than those from Missouri. Even apples grown in northern Missouri did not keep with our apples, the difference being very decidedly in favor of those grown here. If this is a fact, and it seems to be beyond question that it is, it is very important and decisive in our favor in the competition of the future. It is possible that other places can compete with us in summer and fall varieties, but with those they would have reached the limit of competition. If the experience of the past few years continues year by year, it should direct our efforts in the production of winter apples and will be decisive in our favor. West of us the arid regions and the mines will call for fruit that we can supply better than others, and there is an extensive region north to be supplied, so we have prospect of a good market and remunerative prices. In the west, the area of apple growing will be confined to land that can be irrigated, and while they can raise fine fruit, they cannot raise a large amount because the land subject to irrigation is limited, yet it is possible that with increased facilities and additional water supply they may become our strongest competitors. We are at the threshold of the great markets. In the north, unless they can grow the Russians, we must continue to supply their wants. I am told by gentlemen from the east, who are familiar with orcharding there, that the old trees are dying out, and that people are paying less attention to tree planting than in the past. If these are facts we can, as in the past, send fruit to eastern markets. It is true that millions of trees have been planted in the west and south, but the apples from the south will be gone before we need to put our winter apples on the market. March, April and May will be exclusively for us, and if we have the Ben Davis we can supply the demand. There have been

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great reductions of railroad rates within the last fifteen or twenty years, and we may expect still lower rates as the constant tendency is downward. This will enable us to reach more distant markets. As our shipments increase there will be competition and we may expect better terms. When we can get a rate of 30 to 50 cents a barrel to the seaboard we may expect to reach Europe for an additional 25 to 50 cents. With low transportation rates we could reach foreign markets with fruit at $3.00 to $3.50 a barrel and they could retail at $3.50 and $4.00. They think little of paying $5.00 to $6.00 a barrel for apples now and when the price goes down to even $5.00 a barrel the consumption will be great. We often hear people say that when our trees come into full bearing, that the crop will be so enormous that we will not get pay for our labor. I used to hear that when I was a boy in Illinois, but now the price of apples is good there. When you consider that apples can be profitably grown for 25 cents a bushel on the tree, and that when they get down to that great quantities can be sold in Europe, for they have few orchards there, and they must depend on the United States, we will have unlimited markets. We can succeed in growing apples that will keep longer than those grown in southern orchards. I have confidence in orcharding. The business will be subject to ups and downs and we have to face the possibilities of competition west of us, but for favorable locations in southwestern Iowa I know of no business that promises to give better returns for intelligent effort than apple growing, and especially good keeping commercial varieties.

SILAS WILSON: I had thought as to competition from the west. I had a letter from an Omaha firm and they said the principal receipts of apples were now from Idaho. Jonathan gives best satisfaction. The high degree of perfection of apples grown in the Rocky Mountains is truly wonderful. They attain a degree of perfection even greater than in southwest Iowa. They weigh more and keep longer. Apples there can be opened up in July and will retain their flavor. They have advantages there that we cannot have here, and they do not have failures. They depend upon irrigation and are not troubled with insects or fungus diseases.

W. K. FOLLETT: I would like to ask Mr. Wilson where this wonderful fruit country is located?

SILAS WILSON: The Grant valley and Gunnison country, Colorado.

W. K. FOLLETT: Is not the area of fruit lands limited?

SILAS WILSON: Yes, as compared with here.

W. K. FOLLETT: In Utah they grow nice looking apples, but they do not have the flavor, are not good and do not command good prices; and as to worms, there are three or four in each apple. In 1873 M.

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Bently, the cashier of our bank, went to Oregon and brought back an apple that was very large and of fine appearance, and he said that they did not know of the codling moth there, then, but I am told that it is now almost impossible to raise apples there on account of the moth. I want the subject of insects debated, for it will take us all to keep them under control. I have no fears of competition in fruit growing from west of the Missouri river. There in the valleys it gets hot in September and the apples are like those in southern Missouri and Arkansas and they will not keep and do not have flavor. I have seen it freeze ice as thick as a window glass in June twenty-five miles north of Denver, and we all know that fruit cannot stand such weather. Fruit lands west of the Missouri river are limited, and fruit there has bitter rot.

DR. F. M. POWELL: Nova Scotia is recently coming to the front as a fruit region and many apple orchards are being planted. We may expect competition, but if we raise good fruit we can find a market for it.

L. O. WILLIAMS: At the World's Fair the apples grown by irrigation had clear skins and fairer appearance than other apples and looked healthier than any we see here. The finest apples we see in Council Bluffs market now are from Idaho and California. They sell at $2.00 a box of less than a bushel. They are beautiful apples to look upon, and I will try to test them before long to find out as to quality.

W. M. BOMBERGER: Expert labor and special labor amount to something in almost every field of labor. The manufacturer who makes good goods and machinery will find a market for it. So with us, if we raise fruit of fine appearance and high quality we will find purchasers. We want to establish a reputation for our goods. Mills county has a reputation for fruit, and people will come here and buy your fruit at good prices. Southwest Iowa has a reputation and we should be interested in sustaining that reputation.

SILAS WILSON: I have had twenty-seven years' experience in Iowa, and have, from time to time, given you my experience. I have traveled a great deal and observed closely. My interests are in Iowa, and I expect they will remain in Iowa; but facts are facts, and when you go into the Rocky Mountain region, and especially in the Grant valley and Gunnison country, you will find that trees attain a growth, and the fruit a perfection and quality unknown in Iowa, and the results would be surprising to an Iowa man. Apples are heavy, large, quality good, and they color up better than here. I have no interest in booming Colorado, but merely state facts as I have seen them. Col. Brackett, Prof. Budd and Prof. Van Deman will bear me out in these statements. Col. Brackett says he knows no place that

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will surpass Grant valley and the Gunnison country in producing fine apples. They will be a sharp competitor with us. Transportation charges have been reduced there within a few years about 40 per cent, with a prospect of further reductions. They will eventually get fair rates. If friend Follett could see some of the fine orchards of that country he would be ashamed of his orchard, fine as it is. Some of these valleys are 4,000 to 4,200 feet above sea level.

W. K. FOLLETT: The transportation charges are $175 a car to Omaha, and I will sell apples by the carload at that, barreled.

A. F. COLLMAN: I am interested in the apple question. I expect to plant largely. In looking over the awards at the Columbian Exposition, I find that Iowa scored nearly two hundred points more than any other state in the Union.

JOHN Y. STONE: When I was at the World's Fair I saw Col. Brackett peering around among the Idaho apples, trying to identify them. He pointed out the difference. They were larger but not so compact. I was told that the apples of the Rocky Mountain region were not as good in quality as our own. I think I have been told for several years that the apples of California are not as good in quality as they are here. I think it is a law that trees irrigated are not as compact as where grown under natural conditions. We know that Missouri bottoms will grow finer, and perhaps, larger trees than the high land, yet the bottoms are not preferred for fruit lands. Trees grown on the bottoms are not equal in fiber to trees grown on the high lands.

EVENING SESSION—TUESDAY.

President Williams read his address as follows:

PRESIDENT'S ADDRESS.

BY L. O. WILLIAMS, COUNCIL BLUFFS.

As we near the close of another year of labor and toil in horticultural pursuits, it is fitting and proper that we come together again and exchange handshakes and

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look into each others faces. It is well worth our time and expense to come here and exchange friendly greetings and learn from one another the lessons of the year —the new lessons in the book of "Experience."

It is exceedingly meet that we come at the close of this Columbian year and review the part that this society has played in the great exposition. In view of the fact that this corner of the State has been foremost in the work of securing to our State the generous prizes that have been awarded her for her display of fruit, I heartily congratulate this society. We are proud of our State. We are prouder still of our position in the State. We are prouder, yet prouder that we have the banner fruit county of the world in this the banner slope of the banner State of the Union.

While it is well enough for us to be proud of the position we have attained in the horticultural world during the past year, our pride takes a tumble when we consider the fact that for the past two seasons we have been unable to furnish our own homes with even the poorer specimens of the fruit for which the World's Fair has made us famous.

We cannot help feeling chagrined to see New York and Michigan, California and Idaho sending their apples here, as it were, to taunt us with the boast that we have made.

While we console ourselves with the thought, or hope, that this failure is but temporary, let us not neglect the lessons that a wise Providence would have us learn through adversities.

Let us look well to the foundation principles of orcharding and fruit growing in all lines. Study and remember nature's laws in selection of seeds, scions, stocks, soils, etc., in relation to the survival of the fittest. The forests that formerly covered the hills that are now fast being covered with orchards were not reared in a day; and though so rudely and readily laid to waste, their foundations were laid to endure several generations of the fruit trees that are succeeding them. Let us study more closely nature's laws in laying the foundations of our orchards.

It requires faith to plant and grow a hill of corn; it requires far greater faith to plant and rear an apple tree. Fruit growing requires large faith to insure large success, and this is an industry in which *faith* and *work* must be pinned together. Either without the other will die.

RECOMMENDATIONS.

I have a few suggestions to offer in relation to the management of this society.

As will be noted by reference to our programme we have a list of twenty-three directors from as many counties comprising this Southwestern district.

Reports have been called for annually from these twenty-three directors, and it is only with the hope that about one-half of them would not respond that we have been persuaded to retain this long list. The length of our proceedings, if published in full, would (including these directors' reports), exceed the space allotted to us.

We should relieve this pressure on the space by reducing the number of our directors, and if possible, simplify their reports by tabulating.

I would therefore recommend that our district be divided into six subdistricts, each to be in charge of one director. I suggest the following divisions:

Subdistrict No. 1.—Mills, Montgomery, Fremont and Page counties.

Subdistrict No. 2.—Adams, Taylor, Union and Ringgold counties.

Subdistrict No. 3.—Clarke, Decatur, Lucas and Wayne counties.

Subdistrict No. 4.—Pottawattamie, Harrison and Shelby counties.

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Subdistrict No. 5.—Cass, Adair, Audubon and Guthrie counties.

Subdistrict No. 6.—Madison, Warren, Dallas and Polk counties.

I further recommend that these six directors, together with the President of the society, shall constitute a board of seven directors, whose duty it shall be to transact any business that the society may see fit to delegate to it, in addition to preparing their annual reports. Their expenses in attending the meetings of the society should be allowed by the society.

I also recommend that these directors should contain among their number those persons within the district who have charge of experiment stations pertaining to the State society, and that we secure, if possible, a report of their *experimental work*, in addition to their reports as subdirectors. I would have said directors elected to serve for two years, electing one-half of them each year; to begin with, elect one-half for one year, the others for two.

SUPERINTENDENT OF EXHIBITS.

In the management of our fruit displays there seems to be a need for some changes. I would recommend that the entire arrangement and management of the display be given to a superintendent of exhibits, who shall be elected by the society, and who should have his residence at the place where the following meeting is to be held. Said superintendent shall act under such rules and instructions as the board of directors may determine.

OUR FRUIT LISTS.

In accordance with the instructions of the State society we should prepare a carefully revised list of the varieties of fruit trees and plants we can recommend for general planting in this district. I would suggest that the work be delegated to the board of directors.

OUR REPORTS.

I wish to again remind the society of the need for a larger and easier way of communicating our proceedings to the great body of farmers and fruit growers scattered over our territory. We are falling far short of our mission as long as members and readers of our reports are confined to the past or present limited list of names. I hope the time is not far away when the obstacles in the way of supporting our horticultural journal for southwestern Iowa may be overcome.

In conclusion, I wish to express my thanks for the honor conferred upon me by being permitted to serve you in the capacity that I have exercised for the past two years. With best wishes for the future success and influence of this society, I am ever your co-laborer in this work.

A. F. Collman moved that a committee of three be appointed to act on recommendations in the President's Address. Carried. The chair appointed A. F. Collman, F. M. Powell and R. W. Carson as said committee.

Election of officers declared to be in order and resulted as follows:

M. G. Edwards, Glenwood, President.

W. M. Bomberger, Harlan, Vice-President.

Geo. Van Houten, Lenox, Secretary and Treasurer.

Council Bluffs was chosen as place of next meeting, the time to be fixed by the Executive Committee.

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A. F. Collman gave an address on Southwest Iowa at the Columbian Exposition. The address is to be written out for the report and will appear if prepared in time.

THE RELATION OF BLOSSOMS TO FRUIT.

BY PROF. J. L. BUDD, AMES.

The topic assigned me was discussed by my able assistant, Prof. N. E. Hansen, at the annual meeting of the State society, and will be included in our report. Hence, at this time, I will refer to the little known or studied part of the subject, which we may head:

THE PROPER NUTRITION OF THE FRUIT BLOSSOMS.

Recently in many of the states we have had a consensus of opinion favoring the belief that the blossoms of our pistillate varieties of the strawberry would endure unharmed more extreme frosts and adverse weather than those of the perfect flowering sorts. The reason given for this is that the production of pollen is an exhaustive process, and the pistillate sorts, being free from that duty, are enabled to store more perfectly all parts of the blossom with starch. In this case it is now conceded that the perfect nutrition and storage of the pistillate ovary enables it better to withstand frost and storm.

Evidence is now accumulating favoring the belief that the more or less perfect nutrition and storage of the ovary and its parts has much to do with our crops of the orchard fruits. The literature of the subject is more extended than is usually suspected, and in this brief paper we will only be able to glance at a few illustrative examples coming under my personal observation the past twenty-five years.

BLOSSOMS AS AFFECTED BY TOP-WORKING.

A number of years ago I top-worked scions of Sweet June on Fall Orange. The grafts made vigorous growth, and the third spring after insertion they were loaded with blossoms and matured a full crop of perfect fruit. The unusual part came in with the fact that not a single Sweet June tree on the place or in the vicinity that season produced fruit except these top-grafts.

Since that time we have had many bits of experience and observation favoring the belief that recently top-worked apples, plums and cherries, on account of the constriction at the point of union, very perfectly store the cell structure of wood, blossom bud and blossom, with starch, which not only favors early blossoming, but enables the blossom to endure a freeze or storm that would blast less perfectly stored blossoms of the same variety under other conditions.

Our most convincing examples of recent years are with Japan plums and the Sand cherry. As root-grafts during the past twelve years we have had no fruit to speak of on our Japan varieties. They blossom early, and year

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after year on our level and soil the frosts and storms destroy them. But recently top-worked trees on native stocks have borne fine fruit, though blossoming quite as early. In like manner the Sand cherry on our rather low drift soils blossoms freely but bears no fruit. But recent top-grafts on native plum load with fruit.

In these cases, and dozens of others we might present, the setting of fruit under unfavorable conditions results from the ripened condition of the wood, bud and blossom. Our reserve clause "recently top-worked" only implies that if the union is naturally good the circulation in time will be less interfered with, and that the principle here noted will be less noticeable.

THE BLOSSOM AS AFFECTED BY RINGING.

The noted orchard of Mr. Spaulding in Illinois, has furnished some valuable lessons. Being thickly planted he began with ringing alternate trees one way, and later alternates the other way.

On various occasions visitors have expressed surprise that in the rows operated upon varieties were loaded with fruit which as root-grafts were not bearing an apple that season.

Under this heading, if space permitted, we could give many dozens of convincing examples in ringing the apple and the grape. The usual observation is that it favors bearing and an increased size and beauty of the fruit. But closer observation over a considerable period discloses the fact that the blossoms will endure extremes of frost and storm to a remarkable extent.

BLOSSOMS AS AFFECTED BY SOILS.

Very many examples might be given of varieties of the apple and other orchard fruits which are nearly fruitless on the lower levels of our drift soils, and the trees are short lived, while on the loess and bluff soils, and on elevated prairie divides well tile-drained, they give profitable crops and preserve from fair to good condition of tree for many years.

Again, it is largely a matter of nutrition of wood, bud and blossom. With the needed porosity of soil and subsoil to a depth of at least four feet, the nitrogen-feeding roots have a deeper extension and are far more numerous than with the same sorts on soils confining the feeding roots to the surface. But the exposure of the roots near the surface to the varied heats of summer and cold of winter also comes in in the solution of the problem. But we always have the question of perfect feeding and ripening of all parts of the tree before us if we are striving for the paying fruit crops.

The altitude, air-drainage, and porosity of the soil and subsoil also have much to do with rust, scab and other leaf troubles which affect the longevity and crops of given varieties.

BLOSSOMS AS AFFECTED BY MANURE AND WATER SUPPLY.

During a number of years two trees of the Yellow Bellflower attracted much attention at Mt. Vernon, in Linn county, Iowa. They stood in a little ravine, where they had the wash of a livery stable, and all the water that ran from the barn roof, and a basin of several acres. On alternate years these trees were laden with good fruit, and the off years always gave some good specimens.

Again, near Ames, in Story county, on the Kegley farm, two trees of the

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Perry Russet stand where they get the wash from a stock well and the wash of the yards. They have borne fruit regularly, and even the past off year they were fairly fruitful.

These cases are selected out of many for the reason that in the localities named the varieties are notoriously poor bearers and usually wholly fruitless.

As the trees referred to have borne good crops on off fruit years we may safely assume that the conditions were favorable for the nearly perfect maturation of the wood, fruit buds and blossoms.

One other example must suffice. A number of years ago, upon leaving home I instructed a hand to haul some manure on a thin orchard knoll. But he failed to understand, and on coming home I found he had manured the whole length of three rows, covering the whole surface heavily on the black soil as well as on the ridge. In those days we felt certain that the three rows were ruined. But for six years after these rows filled the apple barrel when the other rows gave light crops of poor specimens.

AS AFFECTED BY CULTURE AND SOIL SHADING,

In the same line of the above—the conservation of moisture and soil fertilizing—we have some striking object lessons in the prairie and other states in the way of orchards which have been regularly cultivated in June and the soil shaded during the heated period by a growth of buckwheat while the trees were young, and later by straw or coarse manure on the unshaded surfaces. Even in New Jersey the apple and pear orchards regularly cultivated in June and the surface covered with marsh hay during the summer, have given profitable crops, while the orchards in sod and without manure have been cumberers of the ground.

A number of years ago Mr. Henry Strohm and Dr. George E. Kimball, of Iowa City, drove across the country to inspect an orchard treated in this way by the writer in Benton county. They said then, and have repeated within the past year, that never in any state had they seen an orchard in finer condition or more heavily loaded with fine commercial fruit. This orchard continued to bear fine crops for a number of years when orchards of the same age, and planted with the same varieties, as commonly treated, gave little fruit. The first seven years after this orchard was planted, it was plowed lightly and sown to buckwheat. This single plowing turned under the buckwheat straw of the preceding year, the volunteer buckwheat and the crop of weeds that had started prior to the 20th of June.

After the buckwheat period the ground was plowed each year as before and the unshaded portions were covered in June with straw or coarse manure. The plan is right for an orchard to-day, but the varieties we then grew we cannot plant in Benton county now, as the changed summer conditions noted by Director Sage have given rise to leaf troubles we did not know in the early days. The two past dry summers the orchards of apple, pear, cherry and plum in the State that have given the best crops, and in which the trees are in the best condition, are those that have had needed culture, needed material for nitrogen production and the needed mulching of the unshaded portions during our intense heats. Of course we are now discussing the condition of the whole tree, including the blossoms.

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BLOSSOMS AS AFFECTED BY DETERMINATE GROWTH.

This is the last note our limits will permit, and perhaps it is most important of all. The Oldenburg apple will illustrate the point I wish to make. Over the State, on varied soils, its large thick leaves are free from rust or scab, and without much regard to rain or drought they begin the work of ripening wood, bud and leaf, prior to the advent of frost. In the spring the frosts that blast the blossoms of most of the old varieties do not harm those of the Oldenburg. Hence, the law is: If it bears blossoms, fruit will follow. At this time it will be conceded that we have many varieties from Russia, or of Russian parentage, that behave in this way on varied soils, elevations and exposures. I am also glad to report that our hybrids or crosses from Russian mothers and Jonathan, Grimes Golden, Osceola, Northern Spy, and other well known fathers seem largely to inherit the perfect ripening of wood and perfect storage of the cell structure peculiar to the Oldenburg.

I need not say that our breeding along such lines will give us in the near future varieties with needed hardiness of wood, fruit bud and blossom. In the meantime some of the suggestions of this paper may prove useful.

Geo. Van Houten delivered an address on Hawaiian horticulture, but as this subject was, in part, discussed in a paper (Notes by the Way) written for the State society, it is not reproduced.

MORNING SESSION—WEDNESDAY.

BEST SEVEN VARIETIES OF PLUMS.

BY H. A. TERRY, CRESCENT.

I am requested to make a list of seven best plums, and suppose that this list must include the best for market; that is, the most profitable for that purpose. I am growing a good many varieties that are very excellent in quality, but on account of their being shy bearers, would not be so profitable. It is quite likely and probable that some of the varieties that I shall name as being most profitable on my grounds, would not do so well in other localities, and other growers would be likely to change the list. The varieties in this list have all been fruited several years on my grounds, and with best success. Of course I have many other varieties that are very fine, and some years they are better than some sorts on this list, but are not generally so good. I have selected the varieties that have proved most profitable with me, and if some of my brother fruit growers differ with me I cannot help it; I give what I honestly believe to be the best list for this locality.

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Hawkeye.—This native of western Iowa stands at the head of the list for market purposes, and is fine for home use. It is the largest variety that I have ever grown, and is an annual bearer. Fruit light mottled red, and is very fine for canning purposes. Tree is a strong, healthy grower, and produces wonderful crops of fine fruit. Has proved hardy in Manitoba.

De Soto.—This fine variety comes to us from Wisconsin. Tree a good grower and a heavy bearer, in fact, often bears too full, and fruit is injured so that it is small and quality not so good. When the crop is just right the fruit is very large and of excellent quality; color light red.

Milton.—This is another western Iowa variety, a seedling of Wild Goose. It is the earliest variety that I have ever grown. Tree a good grower and perfectly hardy. The crop is usually all gathered and sold before other plums are ripe. Fruit larger than Wild Goose and of a brilliant light red color, and makes a very fine appearance in the package. It is a heavy bearer.

Hammer.—This is a seedling of Miner and is not disseminated to any extent—tree is an upright grower, as perfect in form as the Miner, and is a heavy bearer of very large fruit of a mottled red color and perfection in quality. The flavor of the fruit appears as if it might have been pollenized by some European variety.

Charles Downing.—This is another seedling of Wild Goose, probably pollenized by some *Americana* variety. Tree is a low straggling grower, but a very heavy bearer of very large fruit of the finest quality, that ripens in succession for a term of three to four weeks; color bright red and very attractive in the package. It is one of our best market varieties. The fruit of this variety is larger, of better quality, and more abundant if trees are worked on peach stocks.

Wolf.—This fine variety originated in the eastern part of our State, but seems to be quite at home on the Missouri slope. Tree is a fine grower and heavy bearer. Fruit large; color, dark purplish red, a true freestone—a valuable variety.

Wyant.—This variety is a native of Iowa, having been found growing wild at Janesville, Bremer county. Tree a low and somewhat straggling grower, but very healthy and hardy, and a heavy bearer. Fruit very large, lightish red; quality, *best.* It is almost a perfect freestone. It is remarkably fine for all culinary uses, and is also an excellent market variety.

In the foregoing list the Hawkeye, De Soto, Wolf and Wyant are in *Americana* family, and are strong self-fertilizers, while Milton and Charles Downing are in *Chicasa* family, and not good fertilizers, but are better if planted alternately with some of the *Americana* varieties. Hammer is also a self-fertilizer.

DISCUSSION.

A. F. COLLMAN: I think all on the list were in our fruit exhibit at Chicago. The Hammer plum was very attractive. Perhaps the most attractive plum was sent by Mr. Carson. It was called the Gen. Hand, but it was not that variety, and may be a new one; it is possibly an old variety whose identity is lost. If it is a good bearer and hardy, I believe it to be the best plum known for this country. The Chas. Downing was fine.

L. O. WILLIAMS: I was at Mr. Terry's place the latter part of August. Chas. Downing was ripe, Milton was gone, and the Hammer was not yet ripe. Milton, Chas. Downing and Hammer are his own seedlings. He has many other seedlings of his own production,

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and raises most known varieties. My neighbors speak of Milton as an improvement over the Wild Goose. It is earlier and larger. The Hawkeye for two or three years has proved almost a failure with me. I think it is because it is grafted on the peach. I shall grub them out and replace them with trees grafted on plum roots. Peach roots are not adapted to any of the *Americana* varieties, but the *Chicasa* varieties will do well on the peach. The peach forces the *Americana* varieties into a rapid growth, but they soon die. The Hawkeye is not adapted to the peach.

A. F. COLLMAN: I want to discuss the plum sent to the Columbian Exposition by Mr. Carson, to have named. I carried it to all the prominent fruit men there but none of them could name it. A gentleman from Illinois called it Gen. Hand. It was blue and nearly as large as a peach, and the flesh cuts open like a peach. It will cook well and not go to juice, as do so many of our plums. It was of excellent quality and if hardy and a good bearer will be very valuable.

R. W. CARSON: The tree is perfectly hardy. I think I can find the name under which I bought it of a Rochester, N. Y., firm. I had many as fine as those I sent to the exposition. It is an upright grower. This is the second year it has borne.

A. F. COLLMAN: I let Professors Bailey and Fowler of New York have samples of it and they said they never saw it before. I showed it to Charles Wright, a plum grower of Delaware, and he said it was the best he had ever seen. I think we ought to call it Carson. It stood on the table six weeks—showing remarkable keeping qualities.

Motion by Mr. Collman that we call it Carson.

R. W. CARSON: I got it from Chase Bros., Rochester, N. Y., and can find the name attached to it.

George Van Houten suggested that as there was a possibility of its identity becoming known that the name Carson be applied to it until its identity shall be known. The motion was so modified and carried.

A. F. COLLMAN: I think it a cross between a European and an American variety.

MR. LOTSPEICH: I have grown the Forest Rose and think it worthy. It is a late plum, larger and better than the Miner.

W. M. BOMBERGER: I got the Forest Rose from the Iowa Experiment Station, six years ago, but it has not borne a plum. Nothing has been said about cultivation, which I consider very important. One can surprise his neighbors by giving his trees thorough cultivation. The plums will be firmer and larger and will sell for double the price of those neglected. I have had best success with the De Soto. If given thorough cultivation, the ground enriched and about two-thirds of the fruit removed, they will grow surprisingly large and be

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of excellent quality. The best European varieties will not excel it if so managed. The plum should be constantly cultivated and the ground enriched. Supply the condition of dropping leaves, and hold the moisture, and you will be satisfied with plum growing.

W. W. LOTSPEICH: The De Soto often forms abortive plums or pockets, while the Forest Rose is perfect.

SILAS WILSON: I think Mr. Bomberger's plan of cultivation and thinning very important. The De Soto overbears, and thinning is necessary for best results. My neighbor, Mr. Fancolly, is a grower of plums in a small way, and raises very fine Spanish King plums.

L. O. WILLIAMS: The best authorities recommend cultivation, but as the trees attain size it is a difficult job. We lack tools for cultivating among trees. I think it a good plan to plant close, but in seven or eight years the trees grow together and it is hard work to cultivate them. I think shallow culture best.

W. M. BOMBERGER: I cultivate plums with raspberries. I do not want sprouts so I cut them down in the fall. I put a pen around and let the hogs run in and then enrich with manure from poultry house.

W. W. LOTSPEICH: Cultivation and soil has much to do with the quality of plums.

A. F. COLLMAN: Yesterday we talked about freight rates. I, for one, feel proud of Iowa and her interests and want to do all I can to advance those interests. In the past few years I have had need to get favors of railroad men, and have always found them ready to respond with facts and figures of interest to fruit growers. When I want to find out how much in shipments we have made I go to Mr. Davenport and he always gives me the facts wanted. I see in the audience Mr. Davenport and I move that he be made an honorary member of this society.

The motion was amended so as to include Mr. Bechtel and passed unanimously.

W. J. DAVENPORT was called for and said: I have talked to conventions and associations, but have not had much experience with horticultural meetings. I thank you for the membership conferred. I was glad to hear Mr. Collman say, that when he wanted anything he went to some one who had the matter in charge, for we cannot know what people want until they tell us, and we always meet demands so far as we can consistently do so. If you come to us we will try to remove all difficulties. We are now publishing matters of interest to the people of this part of the State. Mills county leads in the amount of fruit shipped, while the shipment from several other counties was large. I have passed through southwest Iowa many

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times with passengers and have always told them of the fruit interests of this section. I am glad that Mr. Bechtel is here. He is a fruit grower and can talk to you.

J. M. BECHTEL: I will just say that Mr. Davenport does the talking; I do the work and am not used to talking. The most important consideration in the fruit interest in southwest Iowa is to plant more trees. If you have plenty of apples, buyers will come to you and will compete for your fruit. The reason you could not get better rates years ago was because you did not raise fruit enough to justify it. As soon as large shipments can be made you get a commodity rate. The present rate on apples to Chicago does not pay the railroads as well as the corn rate (quotes figures). So you see that corn pays us the best and we get more money out of it. The Iowa division in 1891, shipped 1,650 cars of apples of 150 barrels per car. I have not the figures in bushels, but any one can figure that out. I think you can depend on the railroads to do their share.

PRESIDENT WILLIAMS: I am glad that rates have been reduced, and we hope for a hearty co-operation between fruit growers and the railroads. I remember that two years ago I and Mr. Bechtel had a friendly dispute over rates at that time. At that time New York and Michigan could supply the markets of northern Iowa and had to pay less for freight than we had to pay from this part of the State. It may be that our east and west rates are reasonable, but it does seem that an improper rate was charged to northern points and on roads running north. I understand that our apples go to Chicago if shipped to northern Iowa points. Of course we cannot blame the C., B. & Q. for this, as they have no north and south road. If, in the controversy, I have said anything to hurt the feelings of the gentlemen I regret it.

J. M. BECHTEL: Until two years ago Iowa did not ship many apples. As soon as the shipments increase to considerable proportions, a rate can be obtained. For example, California and Florida have a rate on oranges, and they can lay their fruit down in our markets at reasonable rates. Two years ago when Iowa had a large apple crop we secured an apple rate that was low. There will be no trouble in getting a commodity rate on anything when you produce it in large quantities.

W. J. DAVENPORT: In one day we shipped that year over 100 car loads of apples through Council Bluffs. They were going into Dakota and Nebraska. Over 1,200 cars went north that year from our road.

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THE CHERRY ORCHARD.

BY SILAS WILSON, ATLANTIC.

The subject assigned me is one that has been in part or wholly neglected. I believe cherry growing can be made profitable in western Iowa. While we are growing apples, grapes and small fruits, we should not overlook the growing of cherries. I am aware of the fact that there is not what we might call a commercial cherry orchard in all southwestern Iowa, and will present some of the difficulties in cherry growing for commercial purposes. In the first place, the location should be considered; second, the varieties to be grown; third, the stock on which the trees are to be grown; fourth, care and cultivation. The best location is the highest land you have on your farm. The best varieties are Early Richmond, Dyehouse and English Morello; in this selection you have the earliest and the latest varieties. The stock on which the cherry should be grown is the Mazzard. The Mahaleb as a stock is as a rule a failure; it generally dwarfs the tree, makes a very imperfect union, and is short lived. The Mazzard stock does not dwarf the tree, makes a perfect union, with a fine root system, and is long lived. Trees should be planted in rows fifteen feet apart north and south; twenty feet apart east and west, thus getting the advantage of the sun between the rows. Give the trees good, clean culture; prune very carefully by thinning out the small limbs during the first three or four years after planting, for the cherry will not admit of severe cutting.

DISCUSSION.

W. K. FOLLETT: Does the Mazzard sprout?

SILAS WILSON: No.

GEO. VAN HOUTEN: While it is generally asserted that the Mazzard and Mahaleb do not sprout, yet if the roots are broken they do sometimes sprout.

F. W. MENERAY: I would like to ask Mr. Wilson if there is much difference between Colorado and Utah?

SILAS WILSON: The soil is similar but it is colder in Colorado, especially at Boulder.

F. W. MENERAY: My uncle has a large cherry orchard in Spring Valley, Utah, and he likes the Mahaleb better than the Mazzard as a stock.

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SILAS WILSON: I am going to draw the line and only propagate on the Mazzard. There is more profit in growing trees on the Mahaleb but the Mazzard makes the longest lived and best trees.

A. F. COLLMAN: I have used both and can see no difference, except you can bud Mahaleb all summer, while the season of budding on the Mazzard is shorter.

L. O. WILLIAMS: I think that grafting on the Mazzard is the best.

W. K. FOLLETT: I have had some experience in cherry growing. I got my trees from New York. I got English Ox Heart, Early Morello, Early Richmond. Some died. The Early Richmond look like other Early Richmond, but never bear to amount to much. I got other Early Richmond of Mr. Terry and they bear two to six bushels to the tree, but they sprout the worst of anything I ever saw.

GEO. VAN HOUTEN: During the last eighteen years I have been reporting profitable cherry trees from our county, grafted on the Red or Black Morello. They sprout badly, but one tree will bear about as much as a dozen on Mahaleb or Mazzard. The sprouts are objectionable, but I would rather have sprouts and fruit, than trees that do not sprout and seldom bear. It has often been stated in our meetings that the dark-juiced cherries do not unite well with Mahaleb. The life is sustained by the bark and a light ring of wood, and they are liable to break off. I do not consider that either the Mahaleb or Mazzard are satisfactory as stocks, but until we know something better that does not sprout, I suppose we will have to use them, as some people will not buy trees that sprout.

O. W. RICH: I have had trouble with trees on Mazzard. They will not make as much growth as on Mahaleb. All dark-juiced cherries should be grafted on the Mazzard.

L. O. WILLIAMS: I am glad to hear these points brought out. Our nurserymen are responsible for many of the failures. It is hard, I know, to be an honest nurseryman. The trade and our horticultural societies should uphold those who do right. The cherry orchard is short lived.

W. W. LOTSPEICH was asked as to his method of growing peaches, and said that his plan was to induce two or three stems to start near the ground and to induce a vigorous growth of five or six feet, and then bend down and cover over winter. The next spring raise up the tops, leaving the body prostrate and pegged down. Stake the top during the summer, and in the fall prune and turn to right or left and cover up. The spring of the body of the trees permits the tops to be turned down without breaking. In this way peaches can be grown as certainly as grapes.

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L. O. WILLIAMS: I think we can get varieties hardy enough to stand without winter protection.

W. K. FOLLETT: I have peach trees twenty-five years old, that are protected from the south wind, in blue grass sod, that bear well. I had some fifteen years that killed out some, but those alive bore this year some fine peaches. They need protection from the south and not from the north. We have supposed that 18° would kill peaches, but mine stood 32° last winter and bore a crop.

W. M. BOMBERGER: I commenced growing peaches on what is considered the northern belt of peach growing. Hill's Chili is considered among the hardiest. For early, Early Rivers, Alexander and Mountain Rose make a good selection. I have not tried the Crosby but it is said to be hardier than Hill's.

GEO. VAN HOUTEN: I have no objections to discussing peach growing as an experiment, or by covering as recommended by Mr. Lotspeich, but the fact remains that our so-called hardy peaches seldom bear unless protected. It is true that the trees stand the winters, but the fruit buds are generally killed and they seldom bear. If good varieties are planted and bent down and covered, as recommended in our reports, peaches can be grown, but the common planter will most surely suffer loss in buying so-called hardy peach trees and allowing them to stand out over winter.

SILAS WILSON: This question was brought up at the Illinois Horticultural meeting last week and the president seemed inclined to choke off discussion. A gentleman said he hoped the discussion on small fruits would be permitted, as apple and other tree fruits had not brought satisfactory returns, while small fruits, and especially blackberries, seldom failed. He had been successful in growing one row of blackberries between the rows of apple trees. The shade of the trees was beneficial and his success was remarkable Prices had been paying. Snyder had been most profitable. His method of culture in open ground was to cut low and get stocky plants. A large per cent of berries matured in the orchard.

L. O. WILLIAMS: At Council Bluffs growers are enthusiastic on the blackberry. They have been more of a success than the strawberry. One grower had a net yield of over $800, on between two and three acres. Snyder is the most profitable.

W. M. BOMBERGER: Receipts for blackberries have been as high as $276 an acre with us, while the cost of care and picking amount to from $35 to $50 per acre. We use a small cultivator, and in covering, a diamond plow and hoe. The cost of covering the first year is about $15 per acre. The mild winters put me off my guard and I quit winter covering. I find I can increase the hardiness by thorough cultivation.

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B. SHONTZ: We find that 100 miles north of here, winter protection is necessary. We can grow good berries when covered. Ancient Briton can be grown just as easily as Snyder, with winter protection, and it is better and bends down easier as the canes are not so stiff as the Snyder. Two men can lay down and cover half an acre a day. Lay the bushes down and pin them; then turn furrows on them and complete the work with shovels. The cost is about $5.00 an acre.

R. W. CARSON: I cut back and make the bushes form low heads, cultivate well and never miss a crop. Blackberries are all the better for a partial shade. If you plant your orchard trees in wide rows you can grow blackberries between. I only grow the Snyder. Cuthbert is the best red raspberry. The Shaffer also does well with me.

MR. WILSON of Mills county: I kept account of one quarter of an acre of Gregg raspberry for ten years and got at the rate of $240 an acre. I have tried fall and spring pruning of grapes, but about this time of year is the best. They kill back if pruned in spring.

R. D. MCGEEHON: While attending the State horticultural meeting, in Des Moines, I met Mr. Thayer, who is perhaps the largest grower of blackberries in Wisconsin, if not in the northwest. He says the Ancient Briton is slimmer and bends easier than the Snyder. The Snyder, as they get old are stiff and hard to bend down. If the Ancient Briton is a success, as it undoubtedly is, it is the best for laying down.

W. M. BOMBERGER: The Gregg is not hardy enough for us; but we can make the Snyder hardy by cultivation.

R. D. MCGEEHON: I had Stone's Hardy twelve years ago, also had Western Triumph, Lawton, Early Harvest and Snyder. Snyder is the only one left out of the lot. Stone's Hardy only had one crop in five years; it generally had the red rust.

O. W. RICH: What do you think of the Older raspberry?

R. D. MCGEEHON: I have had the Older several years and have not gone back on it. It stands heat and drouth best and stands cold.

L. O. WILLIAMS: I believe it will pay to cover raspberries. Last winter I covered two rows of Ohio, and they were the only ones that I got good berries from. The Ohio is considered hardy, generally, but mine that stood out were cut short one-fourth or one-half by the winter. I do not believe I can cover as cheaply as Mr. Shontz does. I estimated the cost at $10 to $15 an acre. In New York, they estimate the cost of covering at $15 an acre. The red raspberries can be covered more easily than the black varieties. Tyler is tender after two or three crops; it covers easily. Ohio and Gregg are more tender than Tyler. Mr. Thayer's plan is to bend in the root. I do not find it necessary to cover the entire bush; simply to have the bushes lie on the ground. In winter you can cover with manure.

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R. D. McGeehon: I have grown all the principal varieties in the last fifteen years. The scab causes many of them to die. The damage comes in July and by the next spring the canes are nearly dead. My Ohio stood out and bore well. I will dig up the Tyler, it scabs badly. Will also dig up Johnson's Sweet for the same reason. We have got to get varieties free from scab or prevent it. It is said that spraying will cure the scab. Gregg does not do well with me. Older is one of the best.

W. W. Lotspeich: Mulching raspberries after fruit is formed, will cause the last picking to be as good as the first.

R. D. McGeehon: It is a big job, unless done with clover as is done by Mr. Thayer. Thorough cultivation is a great help in making a good crop.

AFTERNOON SESSION—WEDNESDAY.

President Williams announced the following committees:
Fruit display.—A. W. Harcourt, O. W. Rich, R. W. Carson.
Resolutions.—W. M. Bomberger, Silas Wilson, C. M. Follett.

STRAWBERRY CULTURE.

BY R. D. MCGEEHON, ATLANTIC.

The strawberry is by far the most important of the small fruits—it responds so readily to good culture that one feels justified in doing his very best, whether growing it for pleasure or profit. We know too well that the average man is not inclined to do very good work. When he engages in strawberry growing he will raise ordinary berries and get them picked and marketed in an ordinary way. His profit, too, will be ordinary.

Now, there is no use in trying to compete with him in his way, for he does cheap work and never knows whether his crop pays him any profit or not. Perhaps his wife and children help in cultivating and do all the picking, so he counts all he gets for his fruit as clear gain.

There are plenty of *ordinary* berries grown in every locality, so there is no encouragement for any one to engage in the business unless he intends to do good work.

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The strawberry seldom disappoints a well-posted, careful grower—he may get from five to eight thousand boxes per acre that will sell in any market at a good paying profit. The requisites for a good market berry are firmness, large size (or at least good, fair size), high color, and colored all over (not white tips). Now if you have a firm berry of large size, of a brilliant, glossy dark red color, and very productive, you have a good market berry, all but quality. If it has good quality you are fortunate, but in our western market fine flavored fruit, if poor in color and small in size, will not sell beside large high-colored fruit that is much inferior in flavor.

In selecting ground for strawberries high land, level (or nearly so is preferable), if it slopes any way I prefer it to slope north or northeast. Land that has been well cultivated in corn or potatoes for two or three years previous is preferable. Plow six or eight inches deep late in the fall before you want to plant. Soon after plowing put from twenty-five to thirty good two-horse wagon loads of well rotted manure on each acre. Spread it evenly all over the ground, and let the winter's rains and snows leach it out and carry the substance into the loose soil. As soon as the soil is in good condition to work in spring, take a Planet Junior five shovel cultivator and go over it until you have the manure and top soil thoroughly mixed; follow this with harrow until you have about three inches of the top soil as fine as it can be made; then go over it with roller (or planker) until it is as smooth as a floor.

Right here I want to say is where a great many berry growers, as well as farmers, make a failure. If you expect a paying crop you *must* prepare the soil in the *best possible condition* before planting. It is much cheaper and easier to mix and pulverize the soil by horse power than man power.

Manure mixed with lumps and clods of earth is about the same as if put in the road, so far as benefit to the crop is concerned. When the ground is well prepared, mark it off in straight rows, three and one-half to three feet nine inches apart; make the mark as light as you can (so you can see it); set the plants from fifteen inches to two feet apart in the row; varieties that make but few plants, like Parker Earle, set fifteen inches; such as Warfield, Wood or Crescent, two feet; use nothing but *good, strong* plants of previous year's growth, trim off all dead leaves and runners, and shorten the roots to about four inches. If you have not good, strong plants of your own growing, you had better pay double price for such than to plant old plants, or poor weak ones that cost you nothing. It costs the same to cultivate and mulch an acre that is half a stand as it does where the rows are all full; and when you come to pick the fruit you will very easily discover where the difference in cost of new plants comes in

I have practiced various ways of planting, and of late years have settled down on the following: A trusty man takes a *bright, sharp* spade; a boy goes along with a pail about half full of water and filled with plants; the man puts the spade into the ground about six inches deep where the plant is to go, then pushes the handle forward from him and draws it back, this leaves a small opening behind the spade; the boy takes a plant out of the water, holding it by the leaves (or crown) and puts the roots down behind the spade, holding on to it until the spade is drawn out and the soil falls in against the roots, the man then sets his foot on the soil close to the crown of the plant and puts his weight on it; this secures it. The boy must

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be careful to keep the crown of his plants even with the surface of the ground, also to spread the roots of the plant out when put in the hole. If the soil is in proper condition and not too late in the season, I seldom lose enough plants for it to be necessary to replant.

As soon as plants start to grow, I commence with my Planet Junior twelve-tooth harrow (or pulverizer). I use that and Planet Junior five-tooth cultivator and hand hoes as often as is necessary to keep *all weeds out of sight* until the fore part of August. I sometimes cultivate eight times, sometimes six will do, but never allow a weed to get one inch high. The easiest time to kill weeds is *just as soon* as you can see them. If the season is dry (as last season was), stir the soil between the rows once a week if possible; keep it pulverized fine, but not deep. This will help very much in holding the moisture, and when rain *does come*, your ground will be in fine condition for your plants to take root. In growing such varieties as Warfield, Wood and Crescent, you must use care that they don't mat too thick in row; if it is a favorable season for plant growth they are sure to do so, and the result will be small fruit and poorly colored. Half to one-third the plants distributed over the ground would give you many more boxes of fruit with berries double the size, better color and quality, that will sell in market for much more money. If one-half of your ground is properly covered with plants that is all you want. The other half is what you need for your pickers to go back and forth on.

As soon as freezing weather commences cover the *entire* field with straw free from weed or hay seed, or prairie hay; or if you can get coarse stable manure, free from timothy and clover seed, it is good, as it answers both for mulch and manure. If you use straw there is little danger of getting it too thick; but no matter what kind of mulching you use, you ought to go over your field as soon as growth fairly starts and take the principal part off the rows and put it in the paths between the rows. We generally use about four good two-horse wagon loads of straw per acre, and can't mulch them properly with much less. If the rows are *perfectly* straight, you can run very close to your plants with your Planet Jr. twelve-toothed harrow, so that there is but a narrow space to hoe with hand hoe. If the ground gets a little hard for that tool, take the five-toothed cultivator with the two and a half inch shovels and stir it up well, going twice between each row, and next time use your harrow to pulverize and level the ground, *always keeping the entire surface of the ground as level as possible.* This in short is about the way I grow strawberries. There are many other things I might mention that are important to know, but our space in the report is limited.

I will, however, risk telling you how I grew some paying crops of berries. About thirteen years ago I had two acres of good prairie soil on a tolerably high divide; it was level and nice, and had been cultivated in corn and potatoes for about five or six years without manure. I plowed it all late in the fall; on 100 square rods of it I put twenty good two-horse loads of manure from a yard and stables where about fifty head of dairy cows had been kept for four years and manure never hauled out. After this was well cultivated and harrowed into the top soil, I marked my 100 rods out *both ways*, three feet nine inches between rows, and planted an Early Wakefield cabbage. About four weeks after I planted a strawberry plant between each cabbage in the row. I kept the cabbage and strawberries well culti-

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vated, pinching the blossoms and runners off the strawberries until my cabbage was fit for market. As soon as cabbage was marketed, I pulled up the roots, ran cross-ways with cultivator until I had the soil between strawberry plants as mellow as ashes. I then turned all the runners into the rows to take root, and when growing season was over I had nice matted rows about eighteen inches wide and plants thick enough to bear good berries. They were two rows Capt. Jack to four rows Crescent. The next spring I dug and sold about $70.00 worth of plants; the remaining plants fruited. After paying for picking, boxes, crates and one cent per box commission to our grocers for selling the berries, I had $455.00 left. The fruit was sold in Atlantic. Berries being scarce everywhere that season, they brought a good price. The first crate sold brought thirty cents per box (to the grocer), and the last one fifteen cents. As soon as the berries were picked, I put about eighteen loads more well rotted manure on same ground, plowed it under and planted it to celery. The celery that grew on that 100 rods brought me within a trifle of $500. I do not know what the cost of growing and marketing that was; I did nearly all of it myself, however. The grocers paid me fifty cents per dozen stalks for it—it was about the largest and best celery I ever saw.

The season of 1890 I had two acres in strawberries; one acre was principally Warfield and Wood, the other Crescent and Captain Jack, with some Bubach. The first acre named was on land that had never been manured, but had been cultivated in strawberries for about five years — taking one crop of fruit from them, and as soon as done picking plowing under the vines and mulching, and sowing to buckwheat, then as soon as it was in full bloom plowing it under, next spring planting to strawberries again. The other acre had been in use about the same number of years for potatoes and garden vegetables; a part of it had been in black raspberries; they were dug up, the ground tolerably well manured and plowed late the fall before planting strawberries. I picked from these two acres the season of 1890 about 14,000 boxes of berries, and at least 2,000 went to waste. After done picking I mowed them off and raked the ground over with a spring tooth hay rake, cleaned the mulching and rubbish all off the ground, run between the rows with an old-fashioned double shovel plow, then harrowed it about four times both ways and left it; when cold weather came I mulched it all over, principally with coarse stable manure. The season of 1891 I picked something over 10,000 boxes from the two acres again; the berries were not as large the second year as the first, but were very good marketable fruit.

Both these seasons were favorable for strawberries. I do not consider these large crops of strawberries, but it goes to show what plenty of manure will do with good field cultivation, and also what you can do with good management without manure, by using buckwheat as a manure. Mr. J. M. Smith, of Green Bay, Wis., puts forty two-horse loads of stable manure per acre on his strawberries each year, and gets from twelve to fifteen thousand boxes of berries per acre. His soil is nearly clear sand; half this amount of manure on our soil, with proper care and cultivation, ought to produce as good results.

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DISCUSSION.

A. C. SABIN was called for and said: Three years ago I could have written or talked on this subject, but for three years I have failed, and do not want to talk on the subject before Mr. McGeehon.

MR. SMITH: I would like to inquire as to the value of Parker Earle.

R. D. MCGEEHON: I have had it three years. I got it from Munson, the originator. It has had a fair crop every year. I have abused it as much as a plant could be abused.

NEW VARIETIES OF SMALL FRUITS.

BY L. O. WILLIAMS, COUNCIL BLUFFS.

The past two seasons have been so unfavorable with me for making a satisfactory trial or test of new fruits, that I feel loth to make any report. I will do so, however, but with the understanding that my report is not final, and trusting that some of my friends may have some experiences in this line that will aid in completing mine.

Last season I fruited for the first time the Parker Earle, Great Pacific, Gov. Hoard, Wolverton, Saunders, Stayman's No. 1, Eureka, and Warfield No. 1, or Sandoval. Owing to the disastrous effects of a hail the fall previous, a hard winter and an unfavorable spring, the results, as I have already stated, were very unsatisfactory.

The first six varieties named gave such assurances of value that I propagated from them further this spring. The last two varieties named (Eureka and Sandoval) I dropped because of the behavior of the plants. At fruiting time I was satisfied with their comparative worthlessness on my grounds. Of the other six varieties the Parker Earle, Great Pacific and Gov. Hoard produced some nice berries.

None of the varieties had hardly half a chance because of the weeds that sprung up when plants were dug from them, and because of a generally poor season. I very much doubt the ability of the Parker Earle to mature its heavy clusters of green berries. While an excellent berry for shipping, its color and quality do not commend it to the home customer. I have faith that the Great Pacific will prove to be a profitable bearer on my grounds. The strong, vigorous, plant-making vine, with the bright, handsome berries commends the berry to my use. Stayman's No. 1 seems to possess strong constitutional vigor of plant, making it able to withstand drouth. Of some ten or twelve new varieties started with this spring, I will only mention the Dayton, Barton's Eclipse, Greenville, Van Deman, Princess, Lovett, Robinson, and Edgar Queen as likely to prove worthy of further trial. I am

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specially pleased with the behavior of Barton's Eclipse, Princess, Lovett and Robinson. The plants seem to possess vigor enough to withstand drouth and rough treatment if necessary. I have had a late spring, leaf skeletonizer, grub worms, mice and moles and a dry fall to contend with in my strawberry plantation.

In my raspberry plantation this spring I added the Palmer, Older (of which I started a few the season before), Kansas, Muskingum (purple), Thompson's Early Red and the Golden Queen. These were all strong plants except Muskingum, and have made a corresponding growth and stand. The present winter and another summer's growth will be needed to test the primary value of these varieties on my grounds. The Golden Queen made a very strong growth, but failed to ripen its wood well. I have covered part of them to make sure of them passing the winter sufficiently well to produce a sample of fruit next season,

Of blackberries I only added the Western Triumph to my list this spring. The plants were bought of R. M. Kellogg, Ionia, Mich., who claimed them to be the most prolific and best blackberry on his grounds. The plants he sent me were No. 1, and have made an excellent growth of stocky and hardy looking bushes. H. A. Terry, of Crescent, has tried this variety on his grounds and commends it highly. I bought one thousand plants of the Ancient Briton this fall and expect to give this much talked of variety a trial the coming spring.

DISCUSSION.

R. D. McGEEHON: I got the Great Pacific from the originator and entered in a contract not to sell it for three years, and will never make another such a contract. Had I contracted to destroy all plants it would have been better for me. I cared for them three years and then plowed them under. It is a miserable shipper, and the last pickings get so small as to be worthless. Some of the berries are very large and others are very small and poor. I plowed Eureka up seven or eight years ago. They got very small toward the last.

PROPAGATING THE GRAPEVINE.

BY O. W. RICH, ATLANTIC.

PREPARING THE CUTTINGS.

The vines that are to be used as cuttings should be pruned in the fall after fully maturing, and before hard freezing. The cuttings should be of sound, healthy wood, from seven to nine inches in length, with from two to three buds on each cutting. The base cut should be about one-half inch

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below a bud. Place the butts all one way and tie in bunches of one hundred. Use wire or willow for tying, as string will soon rot and break. Heel the bunches in mellow soil, with bases up, covering with three or four inches of soil, and before winter sets in, with enough manure to keep the ground from freezing. Remove this manure in early spring, water the cuttings well and watch them carefully until the bases are callused and little rootlets are beginning to start, when they should be planted.

SOIL AND PREPARATION.

The grape requires high and dry soil in the best state of fertility, as after being in red clover two or three years, followed by one crop of corn.

Plow and pulverize the soil not more than one day ahead, and from six to eight inches deep. Heavy string is stretched across the field in straight lines by the sides of which the cuttings are stuck, about two inches apart, into the ground their entire length except about one inch. Keep the cuttings in a perfectly straight line with tops all slanting slightly towards the north. This requires planting in north and south rows. Follow closely after the stickers with a corn plow, covering entirely the row of cuttings.

CULTIVATION.

In from one week to ten days or two weeks, or after the cuttings have nicely rooted, the soil should be worked off from the cuttings. It will naturally settle a good deal, and considerably if there are heavy rains. This soil can be best removed by a twelve-tooth Planet Jr. harrow. A steady horse and a careful workman can do the work of six men with hoes, and in my opinion a great deal better. By proper attention and care the vines can be almost entirely cared for with the Planet Jr. harrow, the Planet Jr. cultivator, and the common corn plow. If the weeds appear they must be removed by workmen with paddles. The best vines I ever raised never had a hand hoe in them. But they must be kept perfectly clean, which can be done only by cultivating at least twice a week until the purslane is killed.

DIGGING, GRADING AND PACKING.

The vines should not be dug until they are fully ripened. As the roots do not fill out until the frost comes, they cannot safely and profitably be dug until about October 15th or 20th. In grading, we tie one hundred in a bunch and make three grades, viz: Nos. 1, 2 and 3. The No. 1 have heavy tops and roots; the No. 2 have light tops and roots; while the No. 3 have short tops and roots, and are used for transplanting. They should be packed with clean moss in tight boxes, so they will not dry out.

DISCUSSION.

The best age of vines being under discussion W. M. Bomberger said he considered good one year vines the best.

L. O. WILLIAMS: I would like to inquire as to depth of plowing and planting of grape cuttings.

O. W. RICH: I plow deep and stick the cuttings slanting, and find that we cannot push them to the bottom of the plowing.

L. O. WILLIAMS: What is called deep plowing? Is eight or twelve inches considered deep plowing?

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R. D. McGEEHON: I do not know how deep I plow, but as deep as two horses can pull a twelve inch plow. I set cuttings at an angle of 20 to 40 degrees, in direction rows run. If slanted across the rows the cultivator will pull the cuttings out.

F. W. MENERAY: In growing fruit we get all the wood we can as low down on the canes as possible.

GRAFTING AND CROSSING THE GRAPE.

BY W. M. BOMBERGER, HARLAN.

The propagation of the grape is so common by the cutting method that it has not been a practice to pay any attention to grafting the grape, yet when account is taken of some advantages in grape-grafting, it is well to pay some attention to it. A scion of a new and high-priced variety may be grafted on a thrifty vine, and strong growth thrown into the graft five to eight feet long, and the graft the following year will bear fruit, while if a vine of the new variety is planted, two and three years are required to get it into fruiting. It more often requires three and four years to get vines of new varieties into bearing as the newer sorts are so often propagated by the use of but one bud, and this is often started in greenhouses, and such vines are weak in vitality. Grapes of weak growing habits can be grafted on strong growers, and grapes of high character in fruit, such as the Delaware, can be improved by grafting on Concord roots.

The scions for grafting should be kept in a dormant condition in winter and put into cold storage in spring until in May, when the new growth is four to six inches in length; and grafting should be done at that stage of the vine's growth. The grafts should be three to four buds in length, and inserted by wedge-grafting. If the vine or stock to be grafted is old, a fine toothed or butcher's saw is necessary to cut groove for insertion of graft. It is best to set it in the crown of the old vine and leave a part of the old vine to receive the upward rushing sap, as if the whole vine is cut off at crown the upward rushing sap is so great that it will drown the graft. The use of the saw is necessary for old vines because the crowns are gnarled wood and won't split. It is best to set vines for grafting and graft when young, two years after setting; then it is more easily done and can be done with a knife. The graft should not be waxed but after being set it should be tied with a ligature, as string or bark, and should be enclosed with good, stiff clay, which lump should be excluded from air by hilling earth up around it to top of graft. The grafting should only be done at surface of ground. Indoor grafting can be done on young vines, like the grafting of apple, but is not much practiced.

The crossing of the grape is a most important subject. As to what varieties to cross for good results is at present, and has been many years, a profound question. The combinations to make has puzzled the writer most in investigating this work. If the blood of different botanical classes are united account in the main must be

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taken of two principal things: *First*, the fruit, which must be improved in quality, productiveness, size, and skin texture; and *Second*, in vine, which must be of standard or increased hardiness, vigorous in growth, and healthful in leaf.

Many other points must be taken into account, as earliness of spring and the formation of root systems. It has been found that seedling production from Concord give valuable results, as we have in Worden, Moore's Early, Pocklington and Cottage; and better results have been obtained in such line of work than by trying the crossing of Concord with its own seedlings, or the European varieties on Concord. This points to the fact that we should plant and experiment more by planting grape seeds. Yet from the present standpoint of the writer's investigations on this subject, we think that something good and superior is possible if the work of crossing is continued by pollinating the large foreign grapes with the pollen of our wild male varieties of the west; and the Brighton and Lady Washington with pollen of Moore's Early and Worden. The reasons given in detail I must omit because they would make my paper too lengthy.

DISCUSSION.

PROF. PAMMEL: In crossing grapes you cannot foretell results. You must experiment. You cannot tell which of the parents has the stronger prepotency, nor will a first cross always give the desired results. Prof. Munson of Texas, has done perhaps more than any other person in crossing and hybridizing grapes. We need some one to do as he has done for Iowa.

REV. NUTTING: When I first saw the Concord I said it is just such a grape as we had in my father's garden. It is a native Massachusetts grape.

MARKETING THE GRAPE.

BY J. P. HESS, COUNCIL BLUFFS.

In extending our vineyards we must look around for a market for our products. Select a location that has advantages regarding transportation facilities as well as a good home market.

These are matters of the greatest importance to the grape grower. After a market has been well established it is important that our products should be brought to the consumer with the least possible expense. And there is no way in which that can be accomplished better than by the growers uniting and organizing an association for the handling of their products.

A well managed organization has a great advantage over the commission houses by concentrating the business that otherwise would be divided among a number of rival commission firms, who, being eager to get the business, often make a sacrifice of the product without considering the interests of the grower.

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Such has been our experience in by-gone days before the advent of our association. Grapes brought to the commission houses, one day brought twenty cents a basket; from what was delivered the next day, of the same kind and quality, the returns were only ten cents a basket and even less.

But in the Council Bluffs Grape Growers' Shipping Association we have a new departure, a market that varies a shade from day to day, of course. But as the consumption of this fruit for different purposes increases, there is no reason we cannot sell our grapes the same as we sell our corn and hogs.

To consign at random to the commercial cities within our territory can only result in loss and confusion to the grower.

Our association, which is less than a year old, has given us satisfactory results, and it is no longer a question with us whether we can establish a market for our grapes at home, and do not have to send them five hundred or one thousand miles away from home, asking some one to give us a bid. Better dump them in vats and make wine and vinegar than follow a system that is so certain of ruinous results to the grower. The past season we shipped about thirty-three car loads of grapes through the association, and every basket was sold before it left Council Bluffs.

Grapes can be produced so cheaply that every family can afford to use them. They are a staple and a necessity, as much as the potato; therefore, they should have a fixed value, regulated only by the supply and demand. Now, when we have established the fact that we will gain by a combination for handling our crop, we will have the best results by observing strict business methods and taking the greatest care in packing and grading, so that buyers will know what they buy We are now using nine-pound grape baskets, which seem to give general satisfaction, both to grower and dealer.

With good, ripe fruit, carefully packed and thoroughly inspected, success is assured for marketing grapes by the association method, both as to economy and by stimulating and developing the industry.

DISCUSSION.

JOHN Y. STONE was asked as to the price of grapes the past season, and answered that he had made no analysis of prices, but from the beginning, with Moore's Early, to the close of the season, prices had been fair.

M. G. EDWARDS said that he had expected to have prices tabulated to present to the meeting, but had not had time to verify the figures, but on the whole prices had been satisfactory to growers about Glenwood.

PRESIDENT WILLIAMS: Council Bluffs has a fruit shippers' association that has been a great benefit to its members. There is a membership fee of $10.00, which entitles the members to a share of the stock of the association. We have forty odd members, making the capital stock over $400. The affairs of the association are managed by a board of directors. We did not pay them for their time this year, but we propose to pay them in the future. The manager is the principal man, and conducts the business. He is hired by the board, and

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gets $125 per month for about five months. It requires a thorough business man to conduct the business successfully. He has not sent out grapes on commission, but sends out price lists, and sells, mostly by the car load. Most of our grapes went to Sioux City, Minneapolis, Denver, Kansas City and Chicago.

HONEY IN HORTICULTURE.

BY R. W. CARSON, MINDEN.

I think that it pays to have bees with fruit growing, to aid in the pollination of the flowers; and also for honey obtained which is good in quality. But the weather has a good deal to do with both cases; if cold or wet or frost at a certain season of the bloom, the results will not be so good. To keep from five to twenty colonies of bees can be managed without any extra expense from fruit growing, but they must have attention in swarming time or there will be a loss. Some one must be appointed to properly attend to this part of the business. Swarming comes in a very busy time, but the buzzing of the bees enlivens work and stimulates every one to activity.

I use the Langstroth hive, ten frames; and Simplicity, ten frames.

This year and last have not been very good honey years with me, but my surplus this year averaged fifty pounds per colony.

DISCUSSION.

W. M. BOMBERGER: I know we can not grow fruit without insects. Bees are not much trouble and a great profit. It would pay the fruit growers of this vicinity to give room for bees.

R. D. MCGEEHON: I have kept bees for a number of years. When it is wet so bees could not work the fruit failed to set.

W. K. FOLLETT: I have watched bees very closely and think it more a matter of imagination than anything else. When pollen drops from bees, as it sometimes does, it is in lumps. The bee does not intend to lose it, and it is generally lost in such a way as not to come in contact with fruit blossoms. When the bees are going to be short of food the queen quits laying eggs, laying just enough to keep up the colony. Bees were very scarce in early days and plums were plenty. Now we have plenty of bees, but few plums.

PROF. PAMMEL: I do not wish to discuss this subject at length, but bees and many other insects are beneficial. It requires only a

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small amount of pollen to produce seed, and it can easily be carried on the wings or body of an insect.

MR. PRITCHARD: I keep bees and have watched their work. If you will notice bees in spring, you will observe that if flowers are ripe and attract insects they will be pollinated. I think it would pay every one to raise bees.

GEO. VAN HOUTEN: I dislike to differ where the opinions seem to be so positive and conclusive, yet my observations lead me to believe that the statement that fruit blossoms can not be pollinated without the aid of insects is not well founded. I agree that insects may aid pollination, and yet my best fruit crops were obtained without the aid of bees, or other insects being noticeably numerous, while my failures have been when there were plenty of bees in the orchard. One rainy spring the bees worked around near the hives, but these trees failed to bear, because, in my opinion, the pollen failed to ripen, or to ripen at the time when the pistils were ready to receive it. The condition of the air has much to do in perfecting pollen and getting the blossoms in condition to receive it. It is true that a blossom requires but a little, and that little can float in the air and come in contact with the bloom, yet I agree that bees and other insects may aid in the work.

DISEASES OF FOLIAGE AND FRUIT.

BY PROF. L. H. PAMMEL, AMES.

It is a real pleasure to address a body of horticulturists on a topic which deeply interests them. Subjects of this kind which have been discussed at various meetings are of vital interest to horticulturists. I know from my experience in this State and elsewhere that the diseases affecting our orchard, garden and farm crops are so numerous that the horticulturist and farmer often is ready to give up in despair. A friend of mine once said: "The future horticulturist of this country must be a man of broad education," and I will add that this man must be thoroughly well posted in all of the lines of vegetable pathology, entomology and other sciences.

If a fungus disease affects his plants he must be able to hold it in check by applying the proper fungicide, or, possibly, follow a different system of tillage. We know too little concerning the laws which underlie the causes of diseases.

I could devote pages to a discussion of the fungus diseases which affect foliage, they are so numerous and important. There is scarcely a plant

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growing but what has some fungus upon its leaves. Von Thümen,[1] an eminent phytopathologist who died a few months ago, enumerates twenty species of parasitic fungi on the leaves of cultivated grapes. Numerous species occur on the cultivated apple, pear, strawberry, cherry, currant, gooseberry, peach and apricot. Our forest and ornamental trees contain many destructive fungi. Our garden vegetables have an unusually large number. Our cereals have as destructive enemies, rusts and smuts, and when we come to our wild plants, the leaves are the delight of the fungus collector.

In this paper I shall content myself in only taking up a few of the very common diseases of economic plants, and horticulture will receive first attention. I shall not duplicate, and ask you to refer to the back volumes of the horticultural report,* where I have described some of the fungus diseases of fruit. I shall take them up in the following order: Apple, cherry, grape, currant, gooseberry and strawberry.

APPLE SCAB.—The disease of greatest importance is Apple Scab, known botanically as *Fusicladium dendriticum*. This disease to-day is one of the most troublesome enemies to apple culture in the United States. It occurs in the entire region east of the Rocky Mountains, and on many different varieties of apples. Some of the very best are seriously affected. A few brief paragraphs from several writers will show the extent of the injury. Mr. Gerald McCarthy,[3] of North Carolina, says:

"Apple Scab is found in all parts of the country, and is everywhere the greatest fungus enemy of this fruit. The annual loss from this disease alone in North Carolina is not much under a quarter of a million dollars." Prof. L. H. Bailey[4] says, "But one who has visited orchards in many parts of western New York this season can readily understand that the diseased foliage itself might be sufficient reason for failure of fruit. Upon trees which were severely attacked, the growth of the leaves was checked and in August they are still half or quarter size and dry and stiff. They are often broken and torn by the winds." The disease has been severe in Wisconsin as Professors Trelease[5] and Goff[6] have shown. Scribner[7] has shown its wide distribution in the United States, and its destructive nature. In 1892 the fungus was common on many varieties of apples in Iowa, and it was especially troublesome to the foliage. The leaves were not fully developed. It produces rounded velvety spots, but later these spots coalesce, become brownish and cover the whole leaf, the leaf then curls and looks as though scorched. Prof. Bailey well says, "The sere and scorched appearance of orchards is often visible a half mile away." In 1892 the Transcendent crab apple presented a sad sight throughout the northwest and this was true also of many of the standard varieties of apples. This disease was much more severe in

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[1] Die Pilze und Pocken auf Wein und Obst. pp. 166, Berlin, Paul Parey, pp. 225, with five plates.

*Fungus diseases of the grape, Iowa Horticultural Report, 1892, p. 487. Fruit rots and their prevention, Iowa Horticultural Report, 1892, p. 422. Leaf spot disease of the cherry, Iowa Horticultural Report, 1891, p. 448.

[3] Bulletin No. 26, North Carolina Experiment Station, p. 15.

[4] Bulletin No. 19, 1890, Cornell University Agricultural Experiment Station, p. 48.

[5] Bulletin No. 23, Wisconsin Agricultural Experiment Station.

[6] Bulletin No. 23, Wisconsin Agricultural Experiment Station.

[7] United States Department of Agriculture, Rep. 1887.

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some localities than in others. The varieties grown on the college grounds suffered only to a slight extent, and this was confined to such as the Genet, Golden Russet, Red Astrachan and Canada Baldwin. The Oldenburg, Anis, Boiken, Zuzoff and others of this class being free. Profs. J. L. Budd[8] and Hansen have made a long list of the apples grown on the college grounds in which the condition of the foliage is noted.

They conclude that "Russian apples have good foliage and are exempt from scab although intermingled in orchards with scabby varieties. In many cases, in Haas trees partly top-grafted with Russian varieties, the Haas part of the top is scabbed while the Russian part is exempt." It is a well known fact that some varieties scab worse some years than others. In remote regions the same variety may scab in one section and not in the other. Climatic conditions may affect the appearance of the scab. What is needed most in vegetable pathology is a study of the conditions which effect or modify these diseases. Before we can draw conclusions we should carefully study all the conditions. Our wild crab (*Pyrus iowensis*) and the other wild species are much subject to scab not only in their wild, natural condition, but when cultivated.

I shall not in this connection discuss the characters of the disease. It is well recognized by the gnarly and disfigured apples. The most important question is, can we prevent this disease? This can be answered in the affirmative and I shall introduce a few figures to show how effective treatment is. Prof. N. E. Hansen, of the Iowa Agricultural College, states that one of the most instructive lessons at the World's Fair was a collection of sprayed Cranberry Pippin, Fameuse[8a] and other apples exhibited by G. T. Powell, of New York. They were the best of those varieties on the grounds. Prof. W. J. Green, of the Ohio Agricultural Experiment Station,[9] gives the following table which shows how effective spraying was in his experiments:

VARIETY.	Per cent in first class, free from scab.	Per cent in second class, somewhat scabby.	Per cent in third class, very scabby and unmarketable.
BENONI—			
Sprayed	83	8	7
Not sprayed	4	58	38
NORTHERN SPY—			
Sprayed	56	43	1
Not sprayed	7	80	13
NEWTOWN PIPPIN—			
Sprayed	15	74	11
Not sprayed		40	60
ROME BEAUTY—			
Sprayed	93	7	
Not sprayed	1	80	19

In regard to marketable apples the Benoni sprayed had ninety-three per

[8] Bulletin No. 18, Iowa Agricultural Experiment Station August, 1892, pp. 516-522.

[8a] Rural Life, October 5, 1893.

[9] Bulletin No. 9, Vol. IV, Second Series Ohio Agricultural Experiment Station December, 1891, p. 190.

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cent marketable and seven per cent not. Not sprayed sixty-two per cent marketable and thirty-eight per cent not. Rome Beauty 100 per cent marketable; not sprayed eighty-one per cent marketable and nineteen per cent not.

Prof. Goff also reports a large increase in marketable apples by spraying with Ammoniacal carbonate of copper. Prof. Garman[10] who used Bordeaux mixture found that sprayed Ben Davis had 12.1 per cent of scabby apples, Check had 65.9 per cent.

For apple Scab use Bordeaux mixture, making one application before the flowers open; follow this by a second when the fruit is set, and a third when fruit is half grown. Dr. Sturgis[11] states that this will be found as efficient as a number of applications later in the season, and I agree with him that it will be necessary to modify these applications by conditions of the weather. The more precipitation, the more frequent will need to be the applications.

APPLE RUST (*Gymmosporangium macropus* connected with *Roestelia pyrata*).—This rust occasions much trouble in parts of our country. This fungus has, as one of its stages, the so-called "Cedar Apple Fungus," which causes the orange galls so common on the Red Cedar during the rainy weather in spring. These gelatinous horns are made up of an immense number of two-celled spores, that germinate immediately, and later produce the Apple Rust on our wild crab, and in the east it occurs on the cultivated apple. The spores of this rust are contained in small cups; they soon germinate, and when falling on the Red Cedar start a chocolate brown gall. It is a curious fact that this rust which so commonly in the east occurs on the cultivated apple (*Pyrus malus*), does not occur on that species in Iowa. Last spring the writer and Miss Wentch, a senior student in the college, made some experiments to see whether it would be possible to produce this disease on other pomaceous fruits by innoculation. We tried the pear, Japan Quince (*Cydonia japonica*), cultivated apple (*Pyrus malus*), Shadbush (*Amelanchier alnifolia*) and Fluke Crab (*Pyrus iowensis*), but with the exception of the Fluke Crab all inoculations proved failures. This crab is top-worked on a Russian variety. All the inoculations made on the wild crab leaves took nicely. The wild crab and Russian variety are nourished in the same way, the roots supplying the same crude material, and yet the wild crab leaves become diseased while the Russian leaves do not. So far as I know, not a single case of this rust has ever been reported on any of the cultivated apples in Iowa. Why is it?

The only way to lessen the injury from this fungus, should it appear on our apple trees in Iowa, is to remove the Red Cedar trees, at least never set them in proximity to an orchard.

POWDERY MILDEW OF THE APPLE (*Spaerotheca mali*).—We have recently studied this disease of the apple, which appears to be most troublesome in the nursery, and suckers which come up around old trees. Like the Cherry Mildew it is well characterized by the formation of a powdery and mealy substance on the stems and leaves. This fungus can be held in check by the timely application of Bordeaux mixture. For other diseases of the apple I must refer you to the report of this society for 1892.

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[10] Bulletin No. 4, Kentucky Agricultural Experiment, Station, Jan., 1893, p. 25.
[11] Bulletin No. 3, Connecticut Agricultural Experiment Station, p. 4.

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SPOT DISEASE OF THE CHERRY.—The most important and troublesome disease of the cherry is this spot disease (*Cylindrosporium padi*), which causes the premature falling of the leaves of cherry trees in the nursery and orchard. As a result of this disease the fruit crop is often cut short, since the necessary storage of starch does not take place. This disease also makes its appearance on the fruit itself. I have discussed this disease fully in the present volume in the report of the Southeastern Society.

POWDERY MILDEW OF THE CHERRY (*Podosphaera oxyacanthae*), which occurs so commonly on our cherry trees, is a very destructive fungus. This has also been discussed in the same place. You can easily recognize it by the powdery appearance of the leaves.

ANTHRACNOSE OF THE RASPBERRY.—Mr. Thayer, of Sparta, Wisconsin, before the late meetings of the Iowa State Horticultural Society, stated that the most serious difficulty in growing raspberries is anthracnose. Prof. L. H. Bailey says:[12] "The most serious difficulty among small fruits which has come under our observation this year is the anthracnose, or cane-rust of raspberries." Miss Freda Detmers,[13] of the Ohio experiment station, says: "This disease has become very destructive in the berry patch, and yet seems to be very little understood by the average fruit grower of the state." It has become destructive in parts of this State. We have seen it on the Black Cap raspberry on the college grounds, in one case destroying many of the canes. What is this disease? It is a parasitic fungus known as *Glœosporium venetum*, Speg., sometimes called *G. nectator*. The fungus was first described in a popular article by Prof. T. J. Burrill,[14] of Champaign, Illinois.[15] Prof. Bailey says it is widely distributed in New York, and that the Shaffer is particularly subject to its attack.

The fungus attacks the growing canes; it begins its work while the canes are yet small. It appears in the form of small round and distinct purple spots scattered irregularly on the canes; these spots increase in size and number, extending around and up the cane. The older spots are round or elongated, whitish, giving the cane a scabby and pitted appearance. It also affects the leaves, forming yellowish spots. The vines are a little swollen, and the affected petioles curl downward. The disease is not fatal the first year, but when they bear fruit the following season its effects are plainly visible on the ripening berries which shrivel and dry up. The fungus produces a white *mycelium*, the vegetative condition of the fungus which penetrates between the cells, and is confined to the bark and cambium layer. In the center of the spot appear little raised bodies; these contain the small one-celled spores which are capable of germinating at once. As to methods of treatment Dr. Thaxter[16] has found that the fungus does not extend from the old growth to the new "canes." He says: "Fresh shoots developed from below the ground, as well as from the old canes above and below the diseased spots showed no signs of the fungus, indicating that its destruction would be complete if all diseased wood were cut in winter, below the lowest spot of *Glœosparium*, and burned." The spots of the previous

[12] Bulletin No. 9, Cornell University Agricultural Experiment Station, August, 1890, p. 55.

[13] Bulletin No. 6, Second series Vol. IV, Oct. 1891, p. 124.

[14] Agricultural Review, Nov. 1882.

[15] See also Dept. of Agriculture Report of 1887.

[16] Annual Report Connecticut Agricultural Experiment Station, 1889, p. 172.

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year give rise in May to a fresh production of spores. Prof. Bailey has also practiced with success the burning of diseased canes in the fall. W. J. Green[17], who has made some experiments in spraying with Bordeaux mixture for *anthracnose*, thinks the results are encouraging.

BLACKBERRY RUST.—Another destructive fungus of the blackberry and the raspberry is the blackberry and raspberry rust known botanically as *Cæoma interstitiale*,[18] though commonly known as *Cæoma nitens*, Schw., which is common everywhere on wild and cultivated forms of both species. The fungus is so striking that all who have grown these plants are familiar with the disease. Its presence is first indicated by the yellow look of the stems and foliage of the new shoots; they are "drawn out" and usually fascicled. The leaves are dotted with small glistening globules known as spermagonia. These contain small minute colorless spores known as spermatia. These spermagonia are soon followed by patches of irregular size which contain a large number of orange colored spores borne in chains, and this stage is the one so conspicuous, and has brought forth the common name, Red Rust. The mycelium of this fungus is perennial as Mr. Newcombe[19] and Prof. Burrill[20] have found. The fungus once established, therefore, will live from year to year in the canes, and in order that it may be prevented the plants should be dug up and burned.

I am afraid that I have nearly reached the limit of the five page rule adopted by the State Horticultural Society in regard to the length of papers, so what I shall say of other diseases will be very short.

PEAR.—The most serious disease of the pear is Pear Blight (*Bacillus amylovorus*), a germ; this, as you all know, by sad experience, is a most troublesome disease, not only to the successful culture of the pear, but to the apple as well. It is so familiar to you that I need not describe it in detail. It is caused by a minute bacterium which is found in the brownish exudate on freshly blighted twigs, also in the cell-sap and in the nectar of the pear flowers. While insects are so important in pollinating flowers, they also carry these germs, and I have been informed by several growers of pears, that blight really begins when the pear comes into flower. What shall be done with this disease? No fungicide can hold it in check, therefore encourage the tree to have good, vigorous growth, and plant them in well drained soils. *Cut the diseased limbs off at some distance below the point of attack and burn this diseased material. Do not wait till many limbs are affected. You must be prompt.* In going from one tree to another use the knife carefully; be sure that your knife has not been in contact with the diseased limbs when you prune.

LEAF BLIGHT OF THE PEAR.—This fungus is one that concerns the nurserymen more in this State than it does the orchardist, and yet the disease is a serious one in pear orchards in many parts of the United States. In New Jersey, New York, Delaware and southern Illinois it is so troublesome in the orchard that some years the pear crop proves to be a failure. It causes premature falling of the leaves, and in many cases the trees are bare

[17] Bulletin Ohio Agrl. Exp. Station, second series, Vol. IV. No. 6, pp. 119 and 121.

[18] Oudemans in Hedwigia, 1891, p. 178.

[19] Journal of Mycology, Vol. VI, pp. 106-107, plates V, and VI.

[20] In Miss Detmer's paper, Bulletin No. 6, second series, Vol. IV. p. 127 Ohio Agrl. Exp. Station.

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by the middle of August, and the fruit crop is cut short. You can find this fungus on all of our pear trees. It forms minute small black specks which contain a large number of spores. This disease first manifests itself either by a bright, red carmine spot or a slight browning of tissues in definite veins. When many spots occur the leaf falls. Bordeaux mixture is a very effective fungicide.

CURRANTS.—Two diseases in Iowa are very destructive; both occur on the leaves. Leaf Spot Disease of Currants is most destructive and is caused by a fungus known as *Cercospora angulata*. The affected leaves have numerous irregular spots with an abundance of long slender spores, which appear on the lower side. The affected leaves fall prematurely, and in many cases currant bushes are bare in August, making it certain that the following crop will be very short. Red as well as black currants are commonly affected with another spot disease (*Septoria ribis*). The leaves are frequently covered with brown irregular spots which contain a small black body—a perithecium filled with small, slender spores. For three seasons we have experimented with fungicides and find that Bordeaux mixture and ammoniacal carbonate of copper are excellent to hold the diseases in check. Apply the fungicide early in June and make at least four applications, more if season is unfavorable.

GOOSEBERRY.—Growers of the gooseberry have long been troubled with the Gooseberry Mildew (*Sphærotheca mors-uvæ* B. C.). This fungus attacks the young leaves "canes" and forming fruit. The affected parts are at first powdery white, then change to a rusty brown, due to the numerous long appendages and the perithecia. The latter contain a small sac ascus. This contains the spores (ascopores) that carries the fungus over winter. Another fungus on the gooseberry is the Cluster Cup Fungus (*Aecidium grosulariæ*). It is a true rust, and occurs on the leaves and fruit. The affected berries are swollen, distorted and seldom mature. The fungus is orange yellow in color and consists of a large number of small cups (*aecidia*), that contain one-celled spores borne in chains. With these cups occur small flask-shaped bodies (*spermagonia*), that contain small spores. On the leaf these occur on the opposite side. So far as I know there is no known fungicide which will keep it in check, and the only suggestion I can make in this connection is to grow such varieties as will resist the disease. I may mention that the fungus occurs abundantly on our wild species. In Europe this Cluster Cup Fungus is supposed to be connected with a two-celled rust (*Puccinia grossulariæ*) which is found on the Wild Red and other currants in Europe. It has also been found in this country, but so far as I know it does not occur in Iowa. It may be that our Cluster Cup Fungus is not connected with that rust, and this shows how important it is to trace out the life history of a fungus before we can suggest treatment.

STRAWBERRY.—The fungus enemies of the strawberry are not numerous. The most serious of the fungus diseases is strawberry leaf blight (*Sphaerella fragariæ*). This disease is often, but incorrectly called "rust." You are only too familiar with the destructive work, and the general appearance of the affected leaves. It is widely distributed in the United States, occurring on nearly all of the varieties after they have been grown for a few generations. And this suggests to me the possibility that we are not careful enough in the selection of our plants for planting. Mr. J. M. Smith, the

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veteran strawberry grower of Wisconsin, still successfully grows the Wilson strawberry, although this is generally discarded by most growers. He attributes his success largely to the manner of selecting plants. He uses plants that for many generations have not borne a crop of berries.

Prof. Goff, in an interesting experiment, has shown that weakened plants are much more subject to this disease and liable to be winter-killed than those taken from plants not diseased. You are all familiar with the fact that when young plants are set out the first season, they are seldom seriously affected by this fungus, but after they have borne a crop, the leaves are seriously diseased. I am strongly inclined to think that we should use greater care in the selection of our plants. We should not grow more than one crop from a bed. This disease can also be prevented by the use of Bordeaux mixture applied once before the plants are in flower and several times after the crop is harvested.

As I have fully treated the diseases of the grape in the Horticultural report for 1892, they will not be taken up here.

You will pardon me for having consumed so much of your time, but if I have interested you sufficiently to investigate some of these diseases, and if you will try the measures suggested I shall feel well repaid for the time and labor spent in preparing this paper.

DISCUSSION.

W. W. LOTSPEICH: I would like to ask Prof. Pammel if there is any practical way of treating trees for curled-leaf? My peach trees sometimes suffer with this disease.

PROF. PAMMEL: I know of no effective remedy except to pick off the leaves and burn them.

Committee on president's address reported as follows:

Your committee appointed to report on the president's recommendations as to change in management of the society, respectfully submit:

First. That we approve his recommendations in regard to the number of subdistricts and directors, except that we recommend that the directors shall be actual members of the society. We further suggest that the secretary of the society shall be a member of said board.

Second. We favor the recommendation of the president in regard to the experiment stations.

Respectfully submitted,

A. F. COLLMAN,
F. M. POWELL,
R. W. CARSON.
Committee.

On motion 10 A. M. to-morrow was made special order for consideration of report of the committee.

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The committee on fruit display reported as follows:

Your Committee on Fruit Display would respectfully submit the following report:

On individual display we find fourteen varieties from J. F. Williams on which we award first premium..... $ 8.00

And twenty-four varieties from J. W. Murphy on which we award the second premium..... 4.00

On thirty-five plates of vegetables from J. W. Murphy on which we award first premium..... 5.00

Also sixty-four best plates of apples from J. W. Murphy on which we awarded first premium on each plate..... 16.00

Also a county collection of sixty-four varieties from Mills county, first premium..... 8.00

There is also on display two plates of very fine Ben Davis from W. W. Lotspeich of Monona county. Your committee could not award them any premium as they were from the Northwestern District. They deserve a premium, however, and also special mention.

[Signed,]

A. W. HARCOURT,
O. W. RICH,
R. W. CARSON,
Committee.

On motion of A. F. Collman and O. W. Rich the report was adopted and premiums ordered paid, including premium to Mr. Lotspeich for apples outside of the territory of the society.

On motion of O. W. Rich the appointment of delegates to other societies was referred to the executive committee with power to act.

Motion of Geo. Van Houten that in fruit display, hereafter, the competition be open to the world.

Carried.

EVENING SESSION—WEDNESDAY.

The evening session was under the control of the Mills County Horticultural Society, with Shirley Gilliland presiding. An excellent literary and musical programme was successfully carried out, followed by a sumptuous banquet at the Glenwood House. All of which was especially interesting to those present, but the crowded condition of the report will not justify a report of this entertainment.

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MORNING SESSION—THURSDAY.

Session opened at 10 A. M., and the special order of report of committee on president's address was taken up for consideration.

A. F. Collman moved to adopt the report.

George Van Houten moved to refer the matter to a committee to be appointed by the retiring president, said committee to report on revision of constitution and by-laws at beginning of next annual session. The motion was modified to include the retiring president as chairman, and passed. The following compose said committee: L. O. Williams, M. G. Edwards, W. M. Bomberger, George Van Houten and Silas Wilson.

On motion of John Y. Stone, it was decided to ask the presiding officers of the several district societies of the State to confer with a view to fixing times for the meeting of the several societies, so the meetings would occur on different dates.

On motion of Silas Wilson the date of next annual meeting is to be fixed by the executive committee.

BATTLING WITH THE BUGS.

BY PROF. HERBERT OSBORN, AMES.

Your president has assigned me a topic which is probably suggested by sad experience in efforts to cultivate and secure fruit in spite of the army of insects that yearly make their depredations and consume a part or perhaps the whole of this crop.

The horticulturists probably more than any other class of cultivators are made aware of the losses they sustain from insects, and I may say too, that they, more than any other class, are alert to avail themselves of the methods of treatment that are known to be of service in this warfare. There are several reasons for this, among which I may mention that the crops raised by the horticulturist, if affected by insects at all, are likely to be completely destroyed, and a total loss in a crop

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cannot fail to attract attention. The agriculturist on the other hand may suffer a loss of a third or a half of his hay or corn every year, and if it is only about the usual amount, be hardly aware of any loss, though the aggregate to him may be greater than to the horticulturist. Then, too, the crops cultivated by the horticulturist are of a character in which the effects of insect work are more apparent. Insects feeding upon the leaves or devouring the fruit cannot fail to be seen, while insects feeding under the ground or working largely at night are not so easily discovered.

In the way of attacking insects the horticulturist has the advantage of a condensed crop, the value of which is such that he can afford to give more time and attention to application of remedies than is practicable in some of the farm crops. Moreover, there are many cases in which he has very efficient and cheap remedies at hand, and all his interests are in favor of the use of active treatment.

The fruit grower of to-day, armed with a good spraying pump and solutions of London purple, Paris green or kerosene emulsion, is equipped for warfare with a large number of his most destructive enemies, and the methods of using these and the cost of equipment and application have been brought to a point where no fruit grower can object to them because of cost or complexity of treatment. I would like at this time to call attention to the fact that these means are not, however, serviceable for every class of insects, and to urge that having reached this very desirable position there should be no halt in the march, but that a steady progress be made in study and experiment with those forms of insects that have not yet been conquered. There are forms not affected by these measures which have great powers of injury and it may well be expected that when the more exposed forms are kept well in check that those less exposed will increase all the more rapidly because of the lack of competiton with the affected forms, and we may have to resort to other tactics, dig new trenches, secure improved arms, and make a new charge on the enemy.

Many of these species will have to be met with, first, a thorough investigation of habits and attention to every exposed position possible. New kinds of insecticides must be discovered and new methods of application devised. This work implies a hearty co-operation on the part of horticulturists and entomologists, and all experience attests that this co-operation will exist. I would like to suggest, particularly in this connection, the desirability of being on the lookout for any new forms of insect injury, with a view to checking any new pest before it reaches the most destructive numbers. Specimens of any insect new to you if sent to the entomologists for examination will receive prompt attention, and you will be informed as fully as possible as to the probable damage to be expected from it and what means are known for its destruction.

DISCUSSION.

W. K. FOLLETT: This subject assumes great importance, and to me it is the most difficult one that I have to deal with. This insect work is all done in the night, when we are supposed to be asleep. They are very shy and it is very hard to catch them at their work. The remedies proposed have generally failed to accomplish the object. If you get the solutions too strong it kills the foliage, and if too weak it fails to kill the insects. Rains wash it off and it seems hard to successfully fight insect pests. I have nothing new to offer on the

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subject, for I wrote all I knew for the meeting, I believe, at Atlantic. The forest birds are our best protection against codling moth, but I am sorry to say, that in many towns they organize gun clubs, elect captains, and go out hunting, killing everything, from the little chickadee, one of the best birds we have, to the quails and prairie chickens. The sap-sucker is one of our most beneficial birds and the woodpeckers do a great amount of good. All of these birds go through the orchard, peering into cracks and under the rough bark, and other hiding places of larvæ, and pick them out very industrously. In Connecticut and other states, it is said they paid bounties for killing of woodpeckers and other birds, and now they are suffering from the ravages of codling moth and other insects, and their fruit is in such condition that it will not sell. These birds are always on the hunt from early morning until night, taking larvæ out of our trees, and yet we allow hunters to come and kill them. One day in early spring, I watched one of these birds, a woodpecker on a Winesap apple tree. He was about twelve feet away and I could watch him, and he went to a crack and picked out three or four worms, and he got as many as seven or eight worms from the one tree. The sap-suckers do the same kind of work. I have noticed a new bird, at least new to me. It is not as large as a wren and is of a greyish lead color. They pick insects out of the blossoms. These little birds are our best friends. I have not gone back on the molasses and vinegar remedy. I put a can in a crab apple tree and got it nearly full. Prof. Riley and other entomologists say these moths are not the color of codling moth, but I think they change color. When buyers first came to my orchard there were no codling moths, but a month later when we began packing, one-third of the apples were wormy. In trapping for moths, there are times for a week that we hardly get any and then there are times that we get the cans full. I tried a new plan, and that was to burn the leaves and trash in the orchard. Some of the worms get up in the trees, but most of them get under the leaves, and these are burned and the moths are destroyed. I rake leaves away from the trees and it is not much trouble to burn over the ground. I expect to disk both ways next spring. I have no faith in spraying.

W. W. LOTSPEICH: What do you think of the English sparrow?

W. K. FOLLETT: They do not eat the things we want them to eat, and eat the things we do not want them to eat. They are a nuisance, yet I will admit that they eat some weed seed but they also eat clover and grass seed. Chickens are good in an orchard.

S. E. OSBORN: In regard to birds, the law protects some and others are not protected. Birds do a wonderful amount of good. There should be no open season and I move that it is the sense of this meeting, that quails should be protected during the entire year.

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Carried.

SILAS WILSON: At the Illinois horticultural meeting last week the reports of spraying for destruction of insects and fungus diseases were very discouraging, and especially for grapes. It is highly necessary that we protect our birds.

AFTERNOON SESSION—THIRD DAY.

The committee on resolutions reported as follows:

WHEREAS, The nineteenth annual meeting of the Southwestern Iowa Horticultural Society at Glenwood has had a most successful and delighful time,

Resolved, That no small part of this success is due to the hearty co-operation of the citizens of Glenwood and the Mills County Horticultural Society, and we feel under obligations for the fine banquet, use of hall, entertainment on Wednesday evening, and the kind and generous treatment given us by all persons.

Resolved, That we appreciate the interest the C. B. & Q. R. R. has taken in the development of the fruit interest in southwestern Iowa, and especially the sending of their representatives, Mr. Davenport and Mr. Bechtel.

Resolved, That we heartily appreciate the reduction made at the Commercial House.

R. D. MCGEEHON,
C. M. FOLLETT,
W. M. BOMBERGER.
Committee.

REPORT OF SECRETARY AND TREASURER FOR 1893—NOT INCLUDING THIS MEETING.

Balance on hand last report	$ 89.15
State Horticultural Society appropriation	150.00
Membership fees	44.00
Total receipts	$ 283.15

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PAID OUT.

A. B. Shaw, on order	$ 10.00	
Salary as secretary past year	75.00	
Premium paid	4.00	
Printing programmes	6.00	
Printing cards	.75	
Cards	.75	
Circulars sent by L. O. Williams	1.75	
Treasurer's book	.50	
Postage during past year	10.00	
Stationery past year	8.00	
Total	$ 116.75	
Balance		$ 166.40

The society has a claim against A. B. Shaw for about $9.00, which will probably be paid. Also a claim against Blue Grass Palace of over $150.00, not likely to be paid without legal process.

GEO. VAN HOUTEN,
Treasurer.

The question of raising nuts was called up and several gentlemen called out. Only a brief outline of the discussion is given.

PROF. L. H. PAMMEL: Pecans are native to parts of Iowa. They occur at Muscatine, and I think can be grown generally over the south half of the State; they certainly should do well here. Hickory nuts should also be planted. Walnuts can be easily grown anywhere in the State. I would advise nut planting generally. The form of English walnut (*Juglans regia*) grown at the Agricultural College seems nearly hardy. Prof. Budd imported it from Russia. The true English walnut is tender in St. Louis. Dr. Dennis, of Cedar Rapids, has Japan chestnuts that are apparently doing well. Chestnuts can be grown all over Iowa. I have seen them growing in Wisconsin. There should be more interest taken in growing nuts.

W. K. FOLLETT: In 1848 there were places in this country where you could scrape up hickory nuts, they were so thick, but there has been no crop since. Pecans seem to live, but as you take them north beyond their natural limit they do not seem to bear.

DR. F. M. POWELL: The shell bark hickory bears on the Institute grounds. The underbrush has been cleared out and the ground tramped hard. As I recollect it, they bear every year.

L. O. WILLIAMS: Chestnut trees on my father's place near Glenwood grew slowly at first, but have done well later.

SILAS WILSON: I think the chestnut can be grown anywhere in Iowa. I know of a number of them in our county that are doing well. I am inclined to think the Japanese is inferior to the American sweet chestnut.

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Adjourned to meet at Council Bluffs at time to be fixed by the executive committee.

FRUIT LIST.

The revision of fruit lists was under discussion, but no revision was made, it being believed that the bulletin of 1891 presents the best judgment of the members as to varieties. This bulletin appears in the report of that date and copies of bulletin will be sent to all applicants.

ADDITIONAL NOTES AND PAPERS.

The following papers were either not read at the session, or read without discussion following their reading:

DIRECTOR'S REPORT OF DECATUR COUNTY.

BY MARK M. SHAW, GARDEN GROVE.

Our season for 1893 opened well, and early planted trees and vines have done nicely.

There was a considerable increase in planting of fruit trees for this year over last, and the coming year promises to far exceed the record of 1893.

The fruit crop was very light on account of a cold and backward spring; however, we have enough for home demand, and a small amount of apples were shipped.

Cherries were an entire failure; strawberries a fair crop; currants yielded an excellent crop of nice sized fruit; blackberries and raspberries were nearly a failure; the pear crop was very small, but of grapes we had a magnificent crop. As other fruit was scarce, grapes sold readily at good prices.

Although this year was not a successful one for the fruit grower, we are not at all discouraged, and hope to have a good crop of fruit the coming season; and we have reason to hope, for Decatur county has raised some grand crops of fruit, and next year will see more trees in bearing (should there be a favorable season), than ever before in its history.

The following varieties of fruit have proven the best for this locality:

Apples: Oldenburg, Lowell, Maiden Blush, St. Lawrence, Wealthy, Grimes Golden, Willow, Ben. Davis, Rawle's Genet.

Pears: Sheldon, Flemish Beauty, Clapp's Favorite, Angouleme, Louise Bonne of Jersey, Seckel, Kieffer, Osband's Summer.

Grapes: Concord, Worden, Moore's Early.

Currants: White Grape, Victoria, Red Dutch, White Dutch.

Strawberries: Crescent, Bubach, Warfield, Eureka.

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REPORT OF POTTAWATTAMIE COUNTY.

BY ALEXANDER WOOD, COUNCIL BLUFFS.

The report from this county this year cannot be made very flattering. Strawberry crop almost a failure; no cherries and very few plums; raspberries and blackberries gave a fair yield and brought good prices; the grape crop was below the average in yield, and although the quality was good, yet the price obtained for them was twenty-five per cent less than last year; apples were an unknown quantity, although our worthy president, in his vigorous search for fruit to send to Chicago, reported having discovered one or two good orchards in the county. The average price of fruit sold by the Council Bluffs Grape Growers' Shipping Association was, for strawberries, $3.12; cherries, $3.00; gooseberries, $3.00; currants, $3.00; plums, $2.33; raspberries, $3.10; blackberries, $2.39 per case of twenty-four quarts; grapes, 19$\frac{88}{100}$ cents per basket weighing nine pounds gross.

REPORT OF AUDUBON COUNTY.

BY E. N. TAGGART, AUDUBON.

Audubon county is situated upon the western slope of our State and is high, rolling prairie, made up of vegetable mold with a prairie subsoil. The water level is about thirty feet deep. Our county is rather new, but is now dotted over with a prosperous class of farmers, who are improving the once prairie sod into beautiful homes, with good buildings, barns, groves, orchards, small fruits, etc., while heretofore the people have been much encouraged in planting out fruits and forest trees.

The season of 1893 has been a discouraging one to fruit growers. The apple crop was a complete failure with but few exceptions. The Oldenburg and Wealthy bore about one-half crop. Most of the winter varieties were a failure. The trees have made a fair growth, considering the extreme drouth, and have gone into winter quarters with well ripened wood and plenty of fruit buds.

The younger trees seem to be in a healthy condition. Some of the older trees are on the decline. Varieties doing the best with us are: Oldenburg, Wealthy,

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Haas, Fameuse, Willow Twig, Genet, Roman Stem. Many others have been planted of the newer and well recommended sorts.

In crabs the Whitney, Martha, Hyslop and Briar's Sweet are the leading varieties. Whitney seems a shy bearer and Hyslop blights in unfavorable locations.

Plums were about one-fourth crop and poor in quality, Wolf, De Soto and Miner taking the lead.

Cherries were a total failure, scarcely any blossoms upon the trees. Trees that have been doing quite well for a few years past show signs of decay and short life, Early Richmond and English Morello being the varieties mostly fruiting. Newer and more promising sorts are being planted.

Pear and peach, apricot and German prune are being planted by some, but comparatively little fruit has been realized as yet, although the German prune and Flemish Beauty pear have borne some fruit where trees are old enough, and seem to be quite promising.

The grape crop of 1893 was immense. All varieties were well laden with fine fruit. Concord, Worden and Moore's Early are the main crop, although many other varieties have been planted and seem to do well, such as Cottage, Pocklington, Elvira, Niagara, etc.

Blackberries were a light crop except where well cultivated or mulched, which bore fairly well, the Snyder being in the lead.

Raspberries were a light crop, owing to the dry weather which prevailed at that time. Ohio, Gregg and Souhegan are the main crop. The Older bids fair to take the lead; Shaffer is not satisfactory, being too soft for market.

Strawberries were a medium crop, the season was shortened by the dry weather. Crescent, Captain Jack, Beder Wood and Warfield are the main varieties.

Currants and gooseberries were poor. Red Dutch, White Grape and Cherry currants, and Houghton and Downing gooseberries are the main varieties.

Forest trees and evergreens are being planted each year by our industrious farmers. Ash, maple, walnut, mulberry, Scotch pine, White pine, Norway spruce, etc., all thrive where proper care and culture are given. I would not forget to say that our country people as well as town people are not forgetting to beautify their homes with flowers, ornamentals, evergreens, etc., which gives evidence of happy homes. May the good work go on.

We have home nurseries where trees and vines, etc., can be obtained, and give the people much better satisfaction than eastern stock that has been shipped in from long distances and sold at fancy prices.

REPORT OF PAGE COUNTY.

BY S. E. FIELD, SHENANDOAH.

This has been a rather discouraging year to fruit growers, though not a failure entirely, and the year may have its compensation in the lessons it teaches. Few farmers had sufficient apples for their own use. Some summer and fall varieties did fairly well. The Oldenburg maintained its former reputation. Fruit trees of all kinds have a healthy appearance and have gone into the winter in good shape.

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The blackberry crop was good in quantity and quality and found a ready market at good prices. The Snyder is the only variety that is planted extensively.

Raspberries were only a medium crop, being injured by dry weather in June.

Strawberries, a light crop, and not well filled out, probably owing to cold, unfavorable weather at the time of blossoming, which also nearly ruined the cherry and plum crop.

Late cherries, like English Morello, bore a fair crop of very fine fruit.

The Pottawattamie is growing in favor as a cooking plum. Many trees on lots in town were well loaded this year.

Grapes were abundant, and of excellent quality. Concord is still in the lead, though many Moore's Early and Worden are being planted; those in bearing this year did remarkably well. The Worden gave a heavier yield than any other variety, the clusters being very large and compact.

We naturally speculate on the causes of failure. My observation and research lead me to believe that the failure of our tree fruits in this section is largely due to excessively dry weather during the last of the season, causing imperfect development of the fruit germs; but it is a condition favorable to the grape and blackberry.

In conclusion, I would say that the present year teaches the safety of mixed farming, and that even in fruit growing "we should not put all our eggs in one basket." Those who plant a variety will not be without the benefits and enjoyments of a fruit diet for their families.

REPORT OF ADAIR COUNTY.

BY L. M. KILBURN, FONTANELLE.

We have experienced another unfavorable year for fruit growers. The trees blossomed quite freely, but failed to develop fruit, except in small quantities, and this fruit, owing to drouth and insect enemies, was of poor quality.

We are of the opinion from long observation, that orchards and perhaps all fruit, need a moist atmosphere, and much ground moisture to develop the highest quality and size of fruit. Strawberries on what we denominate "spouty" land made a good crop, on good corn land they were almost a failure. Raspberries and blackberries in the shade or in a cool location made a good crop; in the full glare of the sun they dried up, and were worthless. There were not cherries enough for the birds and the older trees are rapidly dying out.

The plum crop of most varieties was light, although the Wolf gave us a fairly good crop, and in some localities the Miner did well.

Apple crop generally light and badly infested with worms.

Grape crop very large, and quality good.

There is an increased interest in planting young trees, and nurserymen report good sales. During the heavy snow of last winter the rabbits did very serious injury to young trees and bushes. We have found the remedy most effective to save the trees is to trap the rabbits. They are very easily caught in a box trap baited with corn.

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ORNAMENTALS.

BY W. M. BOMBERGER, HARLAN.

The time in either the newer or older west is not ripe for extensive landscape gardening, as it can be found in the vicinity of such places as Cambridge, Massachusetts, or Germantown, Pennsylvania. It is altogether in place for city park commissioners of our large western cities to plant and plan work in such styles where large sums of public money, in form of taxes, are available. But where a larger part of lands to be planted are farms, and land is plenty, and rural homes of all kinds, even town and city and suburban homes, are imperfectly planted, and so much can be done for comfort of both home and the surroundings of stock with a view of protection and comfort from fierce cold and high winds and burning summer suns, all ornamental planting must for years be largely of a utilitarian character. We must at this time plant with a view to the useful first. The principal planting I would advise to do at present, for both use and beauty, is a most liberal and extensive planting of evergreens. The list of evergreens possible to grow successfully, in the limits of this society, is not large, but while it is best to plant varieties of fruits of all kinds with some caution, with evergreens it is possible to make very little mistake. Our southwestern Iowa district is largely of an undulating character. Long belts of show trees will be beautiful when seen along roads, as well as extensive plants around homesteads and farm yards along line fences that have showy locations, and highway avenues, and will serve to make home comfortable, arrest sweeping, sifting winds, and modify the sudden changeableness of climate. While it will not be possible for us to change the climate of the whole country, each planter can make his own climate and greatly reduce the severity of winter for himself and surroundings.

The extensive planting of evergreens suggested will make the best background for future ornamental work. A large planting of evergreens that has a wide range over a landscape, sets off any section of country, and if extensive planting is indulged in by whole communities it adds largely to the beauty of the whole landscape, and very materially enhances the value of property. Orcharding may have its profits and advantages, but it would be well if whole communities could be induced to plant in part evergreens as they do apple trees. While these would not bear apples, they would in time give large returns in profit in reducing quantity of feed required, and adding to the comfort and cheerful home-like aspect of farms, so that fancy values for such planted lands would be possible.

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We will omit giving the details of evergreen grove planting, and at this time simply urge all to plant. And if you plant evergreens extensively, and give them plenty of room in showy places and places that will shield your premises from the wind, you will be doing the most important ornamental work it is possible to do at the present in this western section of the country.

IOWA FRUIT EXHIBIT AT THE WORLD'S FAIR.

BY A. F. COLLMAN, CORNING.

I was placed in charge of our fruit exhibit by our Iowa Columbian Commission and the directors of our Iowa State Horticultural Society, as successor to Hon. C. L. Watrous, of Des Moines, who turned the exhibit over to me on the 23d day of August, 1893.

When I took charge of our exhibit it was not considered a creditable exhibit for the great State of Iowa by our Iowa Columbian Commission and thousands of our Iowa visitors, as well as most of the leading horticulturists in our country and many of the prominent men from foreign countries. I made an appeal to the fruit men of our great State for fruit. The press of our State deserve great credit for aiding me in the work to make a creditable exhibit for our State.

I also opened correspondence with about three hundred fruit men in our State, and in a few days fruit came from the east, west, north and south, the best they *had*, and *lots of it*. I found it a pleasure to make an exhibit with the great State of Iowa to back me. We knew where most of the fruit was, and found the people very glad to contribute apples, pears, plums, grapes and peaches.

We took a trip to our Iowa State fair and found *all* the exhibitors of fruit glad to donate their exhibit, and they kindly helped me pack seven barrels of good apples. By the kindness of Director M. J. Wragg and Superintendent W. M. Bomberger, who worked hard to help get them ready to ship the last day of the fair, we went back with a glad and thank ul heart.

We found it necessary to have more help, so we were very fortunate in getting the best of help. Mr. Jerry Sexton of Ames, Mr. J. W. Murphy of Glenwood, J. L. and C. B. Collman of Corning, Miss Ella Glover and Miss Jennie Donaldson, both of Corning and Mr. Patten, Jr., of Charles City, all helped in our fruit room and all deserve credit for valuable services rendered.

Our exhibit was made better from day to day to the closing, when we had about one hundred bushels of fine fruit on our tables—3,400 plates, five apples on each plate.

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Our exhibit consisted of:

Varieties of named apples	372
Varieties of unknown and seedlings	30
Varieties of crab apples	25
Total number varieties of apples	427
Varieties of grapes	80
Varieties of plums	59
Varieties of pears	25
Varieties of peaches	10

And some other fruit.

Most of the fruit came from southwestern Iowa. Mills county furnished more than any other county. Sixty counties were represented and about one thousand persons were contributors. Our exhibit proved entirely satisfactory to our Iowa Columbian Commission, Chief J. M. Samuels and the Department of Horticulture, and all the visitors from our State, and our exhibit was highly complimented by intelligent men and women from all parts of the world.

We were awarded *a medal* for the best display of fruit, one on apples, one on plums, one on grapes, one on pears; Mills county one for best county display; Prof. J. L. Budd one on Russian apples; Director M. E. Hinkley one on native plums, and one for best artistic display taken as a whole.

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